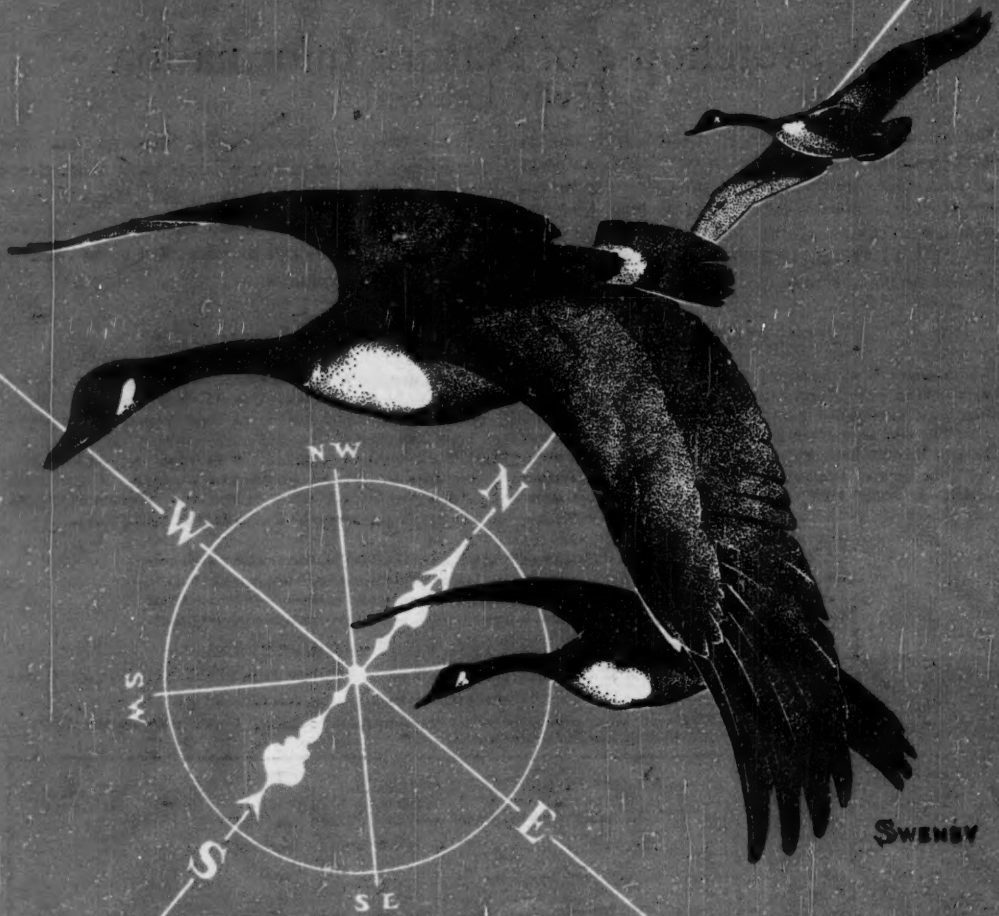


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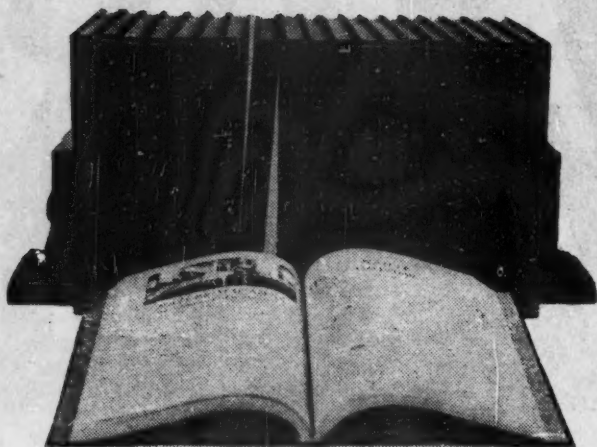


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Glacier Park Guide

Guide to Glacier National Park. By George C. Ruhle. Minneapolis 2, Minn. 1949. Campbell-Mithun, Inc., 1370 Northwestern Bank Bldg. 192 pages, with end-map. Illustrated. \$1.15.

We freely admit that Glacier is our favorite National Park. We have ridden the trails into its incomparable back country, some of them with the author of this guide when he was Park Naturalist at Glacier. (He now holds that position at Crater Lake.) And we suspect that Glacier still ranks high in George's affection, for he has provided in this guide not only a complete Baedeker to the Park but an enthusiastic and understanding description of all that one can find there. This handy little, spiral-bound book is approved by the National Park Service and carries forewords by Newton B. Drury, Director of the Service, and J. W. Emmert, Superintendent of Glacier. Mr. Drury describes the Park as "a very worthy member" of the family of twenty-eight National Parks. He can play no favorites, but we do, and highly recommend both getting to know Glacier National Park and George Ruhle's book as a means of so doing. —R.W.W.

Superstitions

Encyclopedia of Superstitions. By Edwin and Mona A. Radford. New York. 1949. Philosophical Library. 269 pages. \$6.00.

This is, we believe, a book to which the adjective unique may properly be applied. Within its covers are gathered some 2300 superstitions that exist, or have existed, among people throughout the world. Did you know that a new-born baby is in the spell of the fairies until it sneezes, after which it is safe? Did you realize that it is unlucky to sow any seeds during the last three days of March? Did you know that sparrows carry the souls of the dead? Did you know that to kill a cricket is unlucky? Someone, somewhere will assure you that these are truths. And, curiously enough, some superstitions are common to peoples far distant one from another, and far different in background. There are many Nature superstitions, birds being responsible for a considerable list.

Estes Park

Estes Park. By Edwin J. Foscue and Louis O. Quam. Dallas, Texas. 1949. University Press in Dallas. 98 pages. Illustrated. \$2.00.

This is the third in the "American Resort Series," the earlier books having dealt with Gatlinburg, Tennessee, and Taos, Mexico. As a resort, Estes Park antedates Rocky Mountain National Park, to which it is a gateway, but the authors of necessity consider the two together. The National Park was established to protect the high country. This little book is a guide to the region, its history and outstanding landscape features.

New Life Historian

Life Histories of North American Thrushes, Kinglets and Their Allies. By Arthur Cleveland Bent. Washington, D.C. 1949. The Smithsonian Institution. 454 pages. Illustrated. \$1.50 from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

Appearance of a new volume in the notable series of Bent's "Life Histories" is always an ornithological event. This present volume is the seventeenth in this series, the first of which appeared in 1919. It follows the general plan of the earlier volumes. Many ornithologists have, of course, contributed to this volume and eight complete life histories have been provided by Bernard W. Tucker, three by Dr. Winsor M. Tyler, and one each by Dr. Alfred O. Gross, Dr. George J. Wallace, Mrs. Florence G. Weaver, Francis M. Weston and Robert S. Woods. One never holds one of these volumes in hand without realizing the tremendous task of organization performed by the author, or the cooperation provided by a long list of bird students. And, as before, we enjoy Mr. Bent's final sentence in his introduction when he says: "The reader is reminded again that this is a cooperative work; if he fails to find in these volumes anything that he knows about the birds, he can blame himself for not having sent the information to—The Author."

Plant Conservation

Man on the Landscape. By Vernon Gill Carter. Washington, D.C. 1949. National Wildlife Federation. 129 pages. Illustrated. \$1.50.

Vernon Gill Carter is Supervisor of Conservation in the Zanesville, Ohio, public schools, and in this book sets forth the fundamentals of plant conservation as they affect man, and as man affects them. Mr. Carter directs his text to reach a potential audience that includes "the curious citizen, the agriculturist in all his forms, the forester, the home gardener, the feeder of animals both gentle and wild, the sportsman, the nature lover, that considerable body of folk who eat plants on occasion, and in particular, the teacher and student of plant life." This is a large and important audience, and it is one that, once informed, will importantly influence public opinion. Indeed, such opinion must be influenced if we are to survive and to use our land, and the plants that it produces, wisely. As the author says, this book is directed particularly at the teacher, and it is published for its educational value.

Virginia's Forests

Latest addition to the U.S. Forest Service series of bulletins on State forest resources and industries is "Virginia Forest Resources and Industries," by Ronald B. Craig. It is Miscellaneous Publication No. 681 of the U.S. Department of Agriculture, and available from the Superintendent of Documents, Washington 25, D.C., for fifty cents.

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Nature in Print

By HOWARD ZAHNISER

"IN THIS world there are two great wonders, one of life and evolution, and the other man's accomplishments in the inorganic world of mechanics," writes William Beebe in *High Jungle*, his twenty-second volume reporting his own wonderful experience in exploiting the second of those two great wonders, for his better understanding of the former. Few men, if any, have made better use of our modern means of travel, or have taken greater advantage of our civilized conveniences, and it is doubtful that anyone has derived more enjoyment from this much-troubled twentieth century. Yet Dr. Beebe's concern since his long-ago first volume, *Two Bird-Lovers in Mexico*, has been with the ancient and enduring world of Nature. "I have flown planes scores of times," he writes, "yet I have not the foggiest notion of what makes the propeller go round, and why the wheels of a car revolve is wholly beyond my comprehension. A telephone is as mysterious to me as gravity, the radio as the rings of Saturn, while a plane is as inexplicable as a hummingbird. The chief difference in my attitude toward the two classes of wonders is that I have not the slightest wish to dim the perfection of my ignorance as to radios and planes, while I frantically desire to learn everything humanly possible concerning Saturn and hummingbirds."

Some two hundred pages later in this same new volume, Dr. Beebe further defines his purposes as related to the varied totality of life, rather than to the so typical modern specialties.

"There are," he observes, "fortunate naturalists and scientists who, throughout their whole lives, focus without effort on a certain definite creature or group of similar creatures, and these persons are usually the creative ones. I am at a disadvantage. Foremost in my mind is always the desire and hope of seeing, however dimly, back or through or beyond the outward semblance of living beings; back along the line of past evolution, the whence, through, and beyond to the whither of future development. What I feel deeply, by hunch or conviction, is that in my particular case it is from steady concentration on a variety of living organisms and their constant comparison, that, if ever, a glimmering of the truth will emerge."

"Meanwhile," he consoles himself philosophically, "even if this is absolute fallacy, I will be living the most superb existence of any human being in the world (so I think)."

These latter reflections, it is interesting to observe, are Dr. Beebe's rationalization of a sudden shift of his attention in *High Jungle* from a hummingbird to a spider web at the side of his chair. Thus varied are the interests — the intensive interests — of this volume. In a high mountain pass of Venezuela Dr. Beebe and his staff lived for three winters in a large but only partly finished hotel abandoned at the death of its builder, the dictator Gomez. From their investigations Dr. Beebe and his fellow scientists derived the data for 35 scientific papers listed in this volume, and *High Jungle* itself is the harvest for lay readers that has become a characteristic expectation of a Beebe expedition. It is a rich harvest both of fascinating, "strange" facts and of interpretations, and it is an excellent source for an understanding of William Beebe, who himself is so meaningful a phenomenon of our world.

In another recent volume, *Pilchuck: The Life of a Mountain*, Harry W. Higman and Earl J. Larrison have written, with a purpose similar to Dr. Beebe's, about their studies at their own special little mountain, thirty-three air miles northeast of Seattle. Mr. Higman, an outstanding conservationist of the Northwest, an outdoorsman, and photographer as well as student of Nature, has "regularly for a period of over six years" visited this mile-high mountain on the west edge of the Cascade Range, in company with his younger friend, Mr. Larrison, whose early studies

of biology have led to a present study of the ecology of Mt. Pilchuck for a doctorate. Collaborating on their book, they have written in the fictitious first person of one Frank Haller, who, during a long-time occasional exploration of Pilchuck with a biologist, "Doc" Ed Lawson, becomes acquainted with the "practical woodsman," Merle Watson, who also frequents Pilchuck and who becomes a constant companion of "Doc" and the writer.

"Our equipment," writes the teller of the tale in a self-descriptive paragraph of the book, "comprised notebooks, cameras, field glasses, altimeter, thermometer, measuring instruments, and government maps. To the many notes we took we will refer if they have direct bearing on our story. It is only necessary to mention here that ecology, Doc's specialty, is a subject whose findings depend upon the proper evaluation of the animals, the plants, the moisture, climate, elevation, soil, the influence of man, and the interaction of all of them, so that the data to be accumulated were considerable. All of this material went into Doc's brown books, which he numbered as used and then filed in a metal case. Some day this information will be compiled and printed and distributed in many places as a detailed report on the ecology of Mount Pilchuck. But our book has a different purpose: It is to tell of the adventure and fun and outdoor lore which came to us while we were on the mountain. It is a story lightly told of life and not a collection of tables and scientific findings. Except for some contraction of action and elimination and combining of characters made necessary by the long period involved, it is the story of our Pilchuck adventure."

In making of themselves three and writing as one, Mr. Higman and Mr. Larrison have indeed made an interesting literary experiment in trying to convey to lay readers "the life of a mountain." There may be varying opinions as to their success in this literary venture, but it seems certain that readers will agree in appreciating the facts and interpretations regarding Pilchuck that have been here presented so plainly. As George Savage observes in a foreword: "Its thoroughness, its simplicity, its genuinely moving philosophy of nature, and its unsentimental but absolute sympathy with the wild, has created a story that will become part of the reader's consciousness. Higman and Larrison," Mr. Savage says, "have written about the life of one mountain in such a way that for me it has helped in the understanding of all mountains."

It is interesting to see in both these books the emphasis on the meaning to men of the world of living creatures of which man is a part. Dr. Beebe has led in his time forty-seven expeditions, we are told — to South America, India, China, the Malay States, Japan, the West Indies, Bermuda, the Galapagos Islands, and the Sargasso Sea. In *High Jungle* he writes with consummate skill in a medium he has perfected over many years — a book that Edwin Way Teale recently described in the *New York Herald Tribune Weekly Book Review* as standing "very high, indeed, on that ridge where literature and natural history meet." Close at home Mr. Higman and Mr. Larrison have studied the wild life — plant and animal — of one mountain and with enthusiasm have carried their adventures further into their book, *Pilchuck*. Their study of this mountain resembles the sort of study that Dr. Beebe has carried on again and again, concerned as they are with a unity of living things in a definite area — their ecology regarding the unity of the present comparing with his quest through the varied present for the truth of past evolution and the "whither of future development."

Near the end of *Pilchuck* we learn of the visit of a guest specialist whose knowledge of lichens and mosses brought him to this mountain. His wide travels and intense and authoritative knowledge in one field seemed to contrast harshly with the author's own experience, and they tell of it in the course of two pleasant paragraphs.

"We found," they recount, "a half-shaded, half-sunny lunch place where we could easily shift and adjust ourselves to the temperatures. When the wind blew, we sat in the sun, but when it

dropped, we promptly moved a few feet and were comfortable in the shade. Our talk turned to mountains. Our guest has been near the 100 volcanic peaks of Kamchatka, and heard legends of the existence of a mountain range in China which far out-stripped the Himalayas. He had observed the mountains of Alaska through the infrequent breaks in the summer mists overhead, and he had looked down from a plane on their unending peaks as they projected through the fog. He had visited the sheep ranches which stretched almost without limit in Patagonia. The world had been his field, and ours was only a pint-sized mountain on the edge of the Cascade Range.

"He worked around Heather Lake and to the rocks which composed the talus slope. The clink of his hammer sounded frequently. He apparently found much to interest him on this flag-stop along his world route. Pilchuck for the past three hours had impressed me as an extremely small mountain in an unimportant part of the globe. I even began to question the wisdom of our choice. But now I began to get my feet more firmly planted. As I watched our guest chip and collect and package, I thought of the reasons that had put Doc and me on the mountain for this extended stay. I thought of the scientist — was it Louis Agassiz? — who, when he was asked what he had done during the summer, replied that he had got almost halfway across his back yard. We had found no pangolins, neither had we visited countries where enormous tigers lunched on wild boars in beech forests, nor had we been where natives engaged in the gentle sport of inducing hallucinations and weird dreams by drinking an infusion prepared from poisonous mushrooms. We had seen neither the pampas of South America nor the peaks of Kamchatka. We had missed the spectacular but, after all, we were in a place where new things continually confronted and astonished us. Pilchuk was our back yard and we were far from being halfway across it. And there was something to having a hunting ground that was not thousands of miles away. Doc had one kind of a back yard; our guest had another. One was trying to cover much in a small field, the other a little in a wide field. Who could say which, if either, was of greater importance?"

The question, of course, is rhetorical but an answer if awaited might well be, Who but Beebe? — Beebe whose coverage has been "much" and whose field also has been wide? William Beebe certainly would understand without surprise the reasonableness of the subsequent report from "the moss and lichen specialist."

"I just got back the specimens I sent away for examination," it read. "Of the fifty-two kinds of lichens sent in, three genera, twelve species, and fourteen subspecies and forms are new to the State. You have one of the most interesting locations I have visited."

High Jungle. By William Beebe. New York: Duell, Sloan and Pearce. 1949. xii + 379 pp., with foreword by De Forest Grant, text-figure map, 49 photographs on 17 plates (all but 2 by Jocelyn Crane), appendix listing scientific identifications of common names used in the text, appendix listing 39 "published scientific papers from Venezuelan expeditions" of Beebe and staff, and index. \$4.50.

Pilchuck: The Life of a Mountain. By Harry W. Higman and Earl J. Larrison. Seattle: Superior Publishing Co. 1949. xiv + 288 pp., with foreword by George Savage, end-papers map by Robert Bock, 14 line drawings by Edmund J. Sawyer, and index. \$3.50.

Trees

Trees: A Yearbook of Agriculture, 1949. U.S. Government Printing Office, Washington, D.C. 1949. 949 pages. Illustrated in color and black and white. \$2.00.

This year's Yearbook of Agriculture is devoted wholly to trees and forests, much as last year's volume was devoted to the subject of grass. It contains practical information on how to plant, care for, and protect trees; how to manage woodlands. It provides scientific information on the growth habits and characteristics of trees and forests, and basic information on the present status and future demands on American and world forests.

Wild Flowers

American Wild Flowers. By Harold N. Moldenke. New York. 1949. D. Van Nostrand Company. 453 pages. Illustrated in color and black and white. \$6.95.

This is a notable addition to popular botanical literature by the Curator of the Herbarium at the New York Botanical Garden. Two thousand principal varieties of our wild flowers, from Coast to Coast and from Canada to Mexico, are included. Each chapter is devoted to a related group of plants, and the selection of those covered is based upon a nationwide survey of the opinion of botanists. In his text the author has achieved a splendid compromise between readability and identification, geography and botany. The illustrations are outstanding, with 88 species pictured in color and many more in excellent gravure. A selected bibliography is provided, and a thorough index.

How to Prune

The Pruning Book. By Gustav L. Wittrock, Emmaus, Pa. 1948. Rodale Press. 172 pages. Illustrated \$3.00.

Pruning is an old art—as old as plants. However, it is not too wisely or well practiced by many people. So the author of this valuable little book, wishing to stimulate a better appreciation of our shrubs and trees, presents practical advice for the layman on pruning. He covers fruit trees and ornamentals, including hedges and vines.

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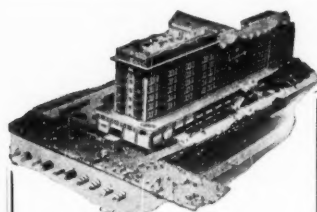
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OUR WONDERFUL HANDS

By MARGARET GROSS GRIEBE

Did you ever stop to think what you would do without your hands? We are dependent upon our hands to express ourselves, yet we humans might never have developed them! Dogs did not develop any, or cows or birds. Dogs can dig and run fast. Cows cannot do much but stand around. Birds can fly, but that is all they can do with what were once their front legs.

It is a little startling to think of ourselves down on all fours, like our four-footed friends. Just imagine yourself with hoofs like a horse, wondering how a flower is made up but not able to sit down and tear one apart, bit by bit, and explore its wonders. You could only step on it, or bite it off and chew it. Or you might look at the stars at night and wonder what they are but there would be no telescope to look through. With no hands no one could make a telescope. No matter how brilliant our minds might be, we could not hold a stick to write down our thoughts, and no one who lived before us could have written down his thoughts and discoveries, either, for us to read.

With four hoofs you would pick up food with your mouth! You would probably eat grass. If you had claws you might catch and eat smaller mammals and birds, raw. You would suck up water from a pond or stream. You would sleep on what you could find, for you would have no fingers to collect plant fibers to weave blankets, or to skin animals to use their hides.

Probably human beings would still have minds better than any bird, fish or animal. How, then, are our hands better even than the front feet of apes? Because we can press our thumbs *against* our fingers and *grasp* objects. In this way the primitive man used a club of stone to beat off wolves. He was able to build shelters and gradually to learn to make himself more and more comfortable. He learned to write and to build and use many kinds of machines.

Helping our hands are our feet, which developed in their own way to take on the entire load of our bodies and leave our hands entirely free. Human feet are different from the feet of every other living thing. Lucky accident or intentional development, our hands and feet were as necessary as our minds to elevate us human beings to the position of masters of the earth.

We can dig better than dogs, but with shovels and mechanical scoops. We can fly faster, higher and farther than birds, swim faster, deeper and farther than fish, and do it sitting quietly in comfort, eating or even sleeping if we wish. We have developed certain plants and animals for our use. We have harnessed fire, electricity, water and even the basic unit of matter to obey our command. We have done countless things, but always with our minds directing our hands.

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Concord Birds

Birds of Concord. By Ludlow Griscom. Cambridge, Mass. 1949. Harvard University Press. 340 pages. Illustrated. \$5.00.

Offhand it might seem that a book devoted to the birds of a single community, and not a large one at that, might have little significance. This might be true for most communities, but not for Concord, and certainly not when the text is the work of Ludlow Griscom. Through the years perhaps more attention has been given to the Concord birds than to those avian residents and visitors to any other restricted region. Thoreau, William Brewster and his fellows of the Nuttall Ornithological Club, and a large company of bird students and amateur bird enthusiasts have turned their attention to the birds of the Concord River and the Sudbury River Valley of eastern Massachusetts. What then, in the light of the decades of ornithological concentration on this area, has been the impact of man upon bird life there? What species have benefited and what have suffered? What is the situation there today? These and many other questions that would be asked by the inquiring bird student are answered by Ludlow Griscom in this interesting and important addition to the ornithological library.

Hunting Bees

The Bee Hunter. By George Harold Edgell. Cambridge, Massachusetts. 1949. Harvard University Press. 49 pages. Illustrated. \$2.50.

For a half-century George Edgell has been a successful hunter of bees and wild honey. His interest in this sport began at the age of ten, and, at eighteen, he wrote an opus entitled "The Bee Hunter." This manuscript failed to lure any publisher and is, the author hopes, now lost to posterity. Instead, we have this little manual, a guide to the art, or sport, or hobby of hunting wild bees and their sweet product. The text is entertaining and practical, and enjoyable reading, even if you never find a bee tree, or try to find one.

Sequoia and Kings Canyon

Sequoia and Kings Canyon National Parks. By John R. White and Samuel J. Pusateri. Stanford, California. 1949. Stanford University Press. 212 pages. Illustrated. \$3.00.

This latest addition to the library of National Park literature is both a history of and guide to these two contiguous parks, the twin parks of the southern Sierra. Colonel White, now retired as superintendent of these reservations, and Mr. Pusateri, temporary ranger and naturalist, collaborate to provide both an interesting and practical volume. We cannot imagine anyone planning to devote much time to a visit to these parks being able to manage successfully without this book in hand.

NATURE MAGAZINE

Contents Noted

CERTAINLY it is obvious that the future of conservation depends upon a conservation-minded rising generation. Certainly, also, it is plain that conservation of the soil is basic in any conservation education program. Yet we wonder how many have ever thought of the problem that confronts the teacher in the schools of a large city. Darwin S. Levine, who heads the biology department of the Lafayette High School in Brooklyn, New York, ran head on into the fact that concepts such as contour plowing, strip planting, even the plow itself, were almost meaningless abstractions to the pupils. Most of them had never laid eyes on a farm; had never seen what good practices could do, or what bad practices had done. Not to be defeated, he conceived the idea of establishing contacts with schools in rural areas and building up a correspondence between pupils on conservation subjects. This strikes us as a splendid idea and one that could work well both ways—giving city youngsters a touch with rural living and country boys and girls a greater appreciation of wise soil conservation policies, some of which, in more advanced areas, they may already have come to take as a matter of course.

FROM Evanston, Illinois, E. Robb Zaring reports an incident that set golfers at the Riverside Golf Club to thinking about Canada geese instead of their own birdies and eagles. A pair of Canada geese had nested, in the spring of 1948, in the rushes along a water hole on the course, the male, however, disappearing. The female, however, returned this spring, built a nest and laid her quota of eggs. After she had sat on the eggs too long a time without result, the club members concluded that the eggs were infertile and that the goose was in for serious frustration. Phoning a zoo, they found that a family of newly hatched ducklings was available. Taking advantage of a temporary absence of the female Canada, the ducklings were substituted for the eggs. Returning, the goose seemed both surprised and delighted. She adopted the ducklings for her own and went forward with the task of raising them as goslings should be raised, which was not without complication.

WORRIED by observations of oriole nesting problems, E. Wendell Lamb, biology teacher at Converse High School in Amboy, Indiana, wonders about the observations of others. He says that "since horse hairs are no longer available in our neighborhood, orioles have changed to weed fibers for nesting materials." He has watched seven nests thus constructed, and, although there have been no high winds to test them, the increasing weight of the young birds has gradually broken down each one of these nests. Have others noted a similar difficulty, he wonders? Orioles, of course, were building their nests from whatever Nature

provided long before the horse was available to supply, as a by-product, nest fiber. And plenty of orioles, nesting away from such a source of supply, have never used horsehairs. It may be that orioles setting up house-keeping close to human habitation have become sloppy builders, but we are inclined to think that the birds who built the nests under Mr. Lamb's observation were just unfortunate in the selection and placement of their materials.

CONGRESS has passed and the President has signed the so-called "duck stamp bill," thus providing more funds for law enforcement and for acquisition, maintenance and administration of wildlife refuges. Under the terms of the law not more than twenty-five percent of the areas thus purchased in the future may be opened to public hunting, under regulation. We opposed the bill before Congress because we objected to the deviation from the original provision that money derived from duck stamp sale should be used for the purchase of *inviolate* wildlife sanctuaries. There was no provision in the original bill that would have protected previously acquired areas enjoying such protection, but that protection was affirmed in the measure as finally passed. While we still think that the law belies the original intent of the act, with existing sanctuaries safeguarded it may be that the need for additional funds, and the progress that has been made in wildlife management, justify the legislation. Even so, we cannot help but dislike the idea of the Federal Government going into the business of operating public shooting grounds.

ENFORCEMENT of game laws today is still largely a negative proposition, says Charles L. Horn, Chairman of the Minnesota Emergency Conservation Committee, and there is much in what he says. He declares that the law officers "still are made to confine their activities largely to telling all and sundry where the fish are hitting or game is ready to be shot, and lying in the bushes to waylay some individual who has taken a sunfish or two over the limit from a lake or stream that is dammed, silted, polluted, dredged and denuded of everything necessary to provide even the minimum of habitat for wildlife and fishlife." Enforcement is, of course, essential, but Charlie Horn asserts that the warden should be really a field representative of the conservation department, trained in all phases of conservation, able to educate and given the power really to do something conservationwise. Such trained people, he says, are coming from the wildlife management and conservation courses in many colleges, and not giving them both opportunity and inducement to become conservation missionaries in the field is a waste of talent and training. This is an important thought, involving both a reevaluation of the job of game warden and the elevation of the position, financially and in the public mind, to a position of greater importance. Such a viewpoint is slowly appearing in some state departments, but it still has a long way to go. R.W.W.



"Woodland roads wander throughout the island, a constant temptation to the leisurely walker."



PHOTOGRAPH BY W. F. KUBICHECK, U.S. FISH AND WILDLIFE SERVICE

Royal terns by the thousands jam the sandspits on the Cape Romain refuge during the breeding season. It is fascinating to watch the young move in flocks along the beaches.

Cape Romain—More than a Refuge

By ANTHONY F. MERRILL

AMONG the hundreds of thousands of tourists who annually pass within easy striking distance of the Cape Romain National Wildlife Refuge, few are even remotely aware of its existence. Of these few only ten or fifteen persons a day ever reach this most delightful "sea island" Shangri La on the South Carolina coast.

Located about an hour north of Charleston, just east of U.S. 17 near McClellansville, the Cape Romain refuge is a fifteen-mile segment of Atlantic coastline that embraces a fascinating area of sea islands, salt marshes, intricate coastal waterways, wide bays and long, sandy, ocean beaches. Focal point of the refuge is the enchanting Bull's Island, an ancient barrier reef of low, gently undulating sand island about six miles long and two miles wide at its widest point. Lying two or three

shallow miles off the mainland, the island's eastern side presents a beautiful long beach to the Atlantic surf. Inland it is heavily forested with lush tree growth, interrupted by large ponds that are the very heartbeat of this wildlife refuge, for on these ponds there congregate in season more than 15,000 waterfowl, which come there to feed, breed or rest.

The western side of Bull's Island tapers off into great tidal marshes through which winding channels meander. Close to the mainland, beyond these marshes, is the Intracoastal Waterway, a dredged channel for small east coast commercial craft and yachts.

A proper visit to the refuge means a visit to Bull's Island. Here are to be found not only the birds for which the refuge is maintained, but also the finest of typical southern coastal scenery. Great live oaks,



PHOTOGRAPH BY THE AUTHOR

Dominic House, the comfortable guest lodge on Bull's Island, is a visitor's facility unique in the Fish and Wildlife Service's system. Behind it rises one of the refuge's four observation towers.

laden with long gray beards of Spanish moss, rise magnificently from the lawns around the guest lodge and along the island roadways. Loblolly pines and magnolias interlace to form, with the live oaks, the major forest cover, and beneath these are the palmettos and other undergrowth characteristic of the area. Woodland roads wander throughout the island, a constant temptation to the leisurely walker. The wide, open beach seems to stretch endlessly north and south, and along it there is scattered an inexhaustible treasure-trove of shells to please the collector or amuse the casual dilettante.

Because the island is accessible by boat — and conveniently so only when the tide is high — it possesses a pleasant air of remoteness from worldly care that always makes the visitor wish he could tarry indefinitely.

But there is more to the Cape Romain refuge than just this beautiful attraction, for the sanctuary begins well to the north, off the little coastal village of McClellansville where the refuge headquarters is located. Cape Romain itself, another sea island, lies at the northern end of the refuge, separated from McClellansville

by thick salt marshes and the Intracoastal Waterway. Bull's Island lies at the southern end of the refuge, south of Bull's Bay, a great open sweep of water. Both the island and the bay were named for an English captain who was among the first of his countrymen to arrive at this particular stretch of coast in 1670.

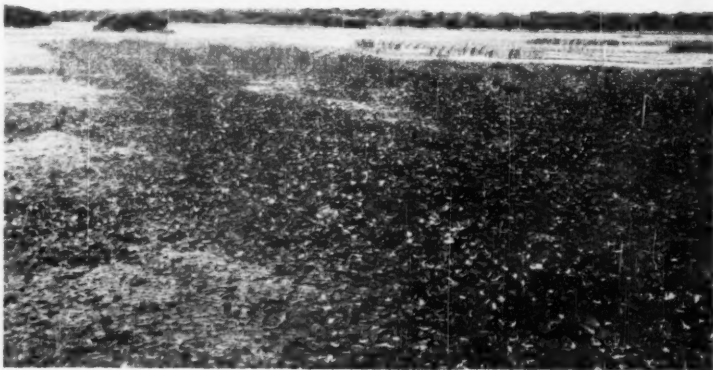
In its seasons the whole refuge teems with fascinating

wildlife. The marsh hen, a "game" bird of these southeastern salt marshes, thrives in the protected refuge. Alligators sun and swim along the island ponds. The great fox squirrels scurry along paths and scramble up the trees of Bull's Island, here reaching nearly their northern limit.

But these are only the beginnings of the Cape Romain attractions, which are so bountiful that almost everyone who is fortunate enough to visit the refuge and its lovely Bull's Island will find something in which he may take great pleasure. Bird watchers make up the bulk of island visitors, brought there regularly in groups by the Audubon Society's Alexander Sprunt, Jr., for a two-day sojourn in bird watcher's heaven. On the island ponds these amateur ornithologists find a range of

ANDREW DUPRE, FISH AND WILDLIFE SERVICE

A rich growth of banana waterlily chokes the surface of the Summerhouse Pond on Bull's Island. It provides, however, an excellent source of delectable food for visiting ducks.



waterfowl that includes hundreds of Canada geese and thousands of mallards, blacks, gadwalls, baldpates, pintails, blue and green-winged teals, ringtails, scaups, golden eyes, shovellers and coots. Last year there were two colonies of royal terns on the refuge, living on two tiny sandspits, an estimated 25,000 of them altogether. Nothing is more delightful to watch than the newly hatched young terns moving in flocks along the beaches. As the waves recede they will scurry out after them to the water's edge only to be picked up regularly by the incoming surf and dumped all along the beach.

The refuge is well populated in migration with other species of shorebirds. Cormorants stand on nearly every boundary warning sign and channel marker in the refuge, gawking about with their long necks and turned-up bills until they take off at last, ahead of visitors approaching Bull's Island on the government boat, just as camera shutters are about to snap at them. Pelicans glide in a stately follow-the-leader up and down the shoreline. Herons — great blue, little blue and Louisiana — stand fishing at the marsh edges, and with them are the American and snowy egrets. Out on the little oyster reefs, which lie barely awash with the changing tides, the oyster-catchers stand deceitfully about, none of them "catching" so much as a single oyster.

If you are not essentially a bird lover, Bull's Island has other charms with which to woo you. Its setting is richly beautiful and its history, while not especially romantic, is interesting and refreshing. Outside of a small "tabby" ruin on the north end of the island — the solidified shell and clay foundation of what was once presumed to have been a watch tower against pirates and cattle marauders — the island's historic associations are slim. In the mid-twenties it was purchased for development as a winter estate and game preserve by Gayer G. Dominic, a New York stockbroker. Mr. Dominic poured a small fortune into the development of a system of fresh-water ponds, the attendant drainage ditches necessary to keep them fresh, and the earthworks necessary to hold back the ever-threatening salt-water infiltrations. In addition he built for himself a comfortable large home, not richly ostentatious in estate style, but designed to supply a simple spaciousness for his living needs. This home, now called Dominic House, serves the island's visitors as a guest lodge, a unique facility found on only one

other refuge in the Fish and Wildlife Service's system of more than 280 refuges. Fifteen guests at a time may be accommodated here, and, both in and out of season, the lodge receives constant patronage.

In 1936, after ten years of intensive development work, Mr. Dominic sold Bull's Island to the U. S. Government for about \$35,000, an exceptionally low sum, even by depression standards. In fact, the Fish and Wildlife Service thinks of the island almost as an outright gift.

Fortunately the CCC program permitted the Service to deploy several hundred men over its new possession in a highly successful effort to convert the property into an adequate wildlife management area. The boys improved the drainage, built great dikes, and added considerably to the island's road system. They also tackled the island's greatest natural problem, the ocean.



ANDREW DUFRE, FISH AND WILDLIFE SERVICE

Sometimes the sea breaks through the soft barrier of dunes protecting the inland ponds of Bull's Island. Enough storms and breaks like this one will eventually destroy valuable fresh-water feeding grounds for ducks.

It is the tendency of these South Carolina barrier islands to erode on their northern ends and build up on their southern ends. This erosion is at its worst during a northeastern blow, when the waves come in and take huge bites out of the soft sandlands. Unprotected sandspits actually appear and disappear with these passing storms.

At this contemporary point in its natural history Bull's Island is being subjected to a sharply accelerated erosion, and the havoc being wrought by the surf is dramatically illustrated by the bare bones of hundreds of toppled trees that lie whitening on its northeastern beaches. The ocean has eaten away at Bull's Island

Fit subjects for Salvador Dali, the bare bones of these trees along the island beach are dramatic evidence of the vicious erosion of the northeast storms that beat upon the Sea Islands.



PHOTOGRAPH BY THE AUTHOR

in a drastic fashion. It has completely swallowed a lighthouse, an entire cape and countless acres of irreplaceable forest. Its next objective is Jacks Pond, the refuge's largest fresh-water lake. Between the pond and the hungry sea lie a thin sand dune, a low, level sweep of marsh and a CCC-built dike. One violent northeaster could hurdle the sand barrier, sweep across the swamp and chew a hole through the dike. Salt water would then flood Jacks Pond and kill the fresh-water growths upon which the ducks feed, and that would be a disastrous blow to the whole refuge.

Ten years ago the CCC poured many man-hours and a great deal of money into the erection of a long series of heavy wooden fences that run out into the ocean at right angles to the beaches. It was hoped that these would deflect the force of the eroding waves during a storm. It is doubtful that they ever did much good, but even if they did, the wood planking was unable to resist the marine borers that eat wood with more zest than the termite. Today the expensive project is rotting swiftly away, and the trees topple down the retreating banks and come to rest upon the useless fences.

Occasionally the four men who now endeavor to maintain and operate by themselves the forty-nine thousand acres of Cape Romain refuge deliberately admit salt water to the ponds in a very interesting management experiment that should increase the growth of duck food and thus increase the capacity of the refuge. The problem-child on the ponds is the cattail. Allowed to get out of hand it chokes the surface of a pond so badly that waterfowl cannot push through it to feed. At the same time it chokes out things like wild millet, an epicurean treat for the average duck.

To combat the cattail the Fish and Wildlife people let salt-water into one of the worst of its problem ponds a season ago on the assumption that it would kill out this reedy pest. It did. Now the pond is being reconverted back to fresh-water and wild millet is being introduced. Another year should find this pond with a healthy crop of duck food growing on it.

At Bull's Island the ponds are constantly manipulated to promote the growth of duck foods. Most waterfowl foods grow best in water from one to two feet deep, but on one of the ponds a fine growth of salt

marsh bullrush, *Scirpus robustus*, must be protected against water of this depth if it is to thrive at all. And during the winter when the birds are in residence all the ponds are lowered to make as much food available to the waterfowl as possible. Thus water manipulation provides growth for valuable foods, accessibility of foods for the birds, and provides for us an excellent example of what is meant by the term "wildlife management."

The ponds do not always present headaches. On one of them there is a beautiful growth of banana waterlily, *Castalia flava*, which is said to be the best spread of this excellent, flowering, duck food to be found anywhere in the Carolina coastal region. Then, too, the ponds are ideal for fishing since they are stocked with large-mouth bass, goggle-eyed (or wall mouth) bass, blue bream, crappie and mullet. An interesting thing about the mullet is that it is left over from the days when the ponds were in salt-water.

The refuge is exceptionally proud of its pure-blooded wild turkeys, which it imported and keeps pure because of the protection offered by the island against introduced domestic fowl. It is this domestic interbreeding that makes pure wild turkeys so rare these days in mainland areas.

Shy when they are in the woods, the turkeys come up on the lawns of Dominic House to feed as casually as though they were the tamest barnyard fowl. Shy, too, are the many white-tail deer that live deep in the island's undergrowth. But in the early dawn they often drift in to the open lawns about the guest house, and the early-rising visitor may look from his window to see another of the company of natural treasures that makes a trip to the Cape Romain refuge such a rewarding experience; one in which many lovers of the outdoors would find great charm.

Of course the deer eat up (Continued on page 392)



Sand dunes at China Cove, San Clemente Island, showing the manner in which the great spreading plants of abronia knit together the sand and act to hold the dunes in place.

Plant Hunting on an Island

By NELL MURBARGER

Photographs by the Author

SAN Clemente Island, lying seventy-five miles west of San Diego, California, is like several worlds within a world.

It is a world of jagged headlands, high, windswept mesas, shifting sand dunes, wooded valleys, lush green meadows, yawning volcanic caverns, precipitous canyons. Every part of the island has its individual climate. Nothing could differ more radically than the east and west sides—one a land of rich humus, violets, ferns and spring-watered green slopes; the other, a dry, hot, wasteland of cactus-infested lava breaks.

On the Island's northwest side there are acres upon acres of sand dunes, as restless as the waters that lave the shores; on the southeast side there are canyons so sheer of wall that one's eye may travel up their rocky sides for a thousand feet and at the top find the sky stretching away in a narrow river of indigo.

Before my first visit to the island, I



was informed, definitely and positively, that there was nothing of interest to a botanist; that there was neither shrub nor tree on the entire 31,500 acres. Still, I reasoned, there must be some sort of plant life. Besides, three other adventuresome souls wanted to inspect the heavily-guarded empire. So we wangled a ten-day visitor's permit from the lessee of the Island.

Practically the only thing our party acquired during that first trip was an insatiable determination to return. But ten years passed before that goal was realized. Meanwhile, San Clemente had been taken over by the U.S. Navy. When we again went back, it was for six months. Our party consisted of a zoologist, two archeologists,

Member of the author's party examining part of a skeleton found in cave at right. Snake cactus, like sinewy pythons, hangs pendant from the cliffside far above.



Near the summit of Mt. Cortez, east side of San Clemente Island, showing rough topography of canyons and ridges.

and myself—rather a Grade B botanist—who was commissioned to make a complete collection of the Island flora for the University of California at Berkeley.

During the six-months search, in which the zoologist and I pooled our efforts—to our mutual benefit—we collected 205 species of plant life, exclusive of lichens and fungi. This represented some 100 varieties more than had ever been credited to the Island by previous naturalists.

San Clemente proved to be a land of concentration and individuality. We found certain species of trees confined to a few specimens on a single ridge. Four or five plants of a species might be encountered in an area the size of a dinner table, and never another found elsewhere.

Many of the Island plants are extremely rare. In three canyons on the island's west side we found growing a total of eight beautiful shrubs, several of them as much as ten feet in height. This shrub is known as *Crossosoma californicum*, and is so rare it has never been accorded a common name. So far as is known, it is confined to the California Islands of Santa Catalina and San Clemente, and to Guadalupe Island, off the coast of Mexico.

On all of our exploration, we found only one specimen of *Baccharis pilularis consanguinea*, a densely foliated, sticky leafed shrub whose all but unpronounceable name is entirely out of proportion with the importance of the plant. Search also failed to reveal more than one specimen of a buckthorn sub-species that had been taken sparingly on Santa Barbara and Catalina Islands but was never before reported from Clemente. Although five species of the genus *Atriplex* (salt brush) were collected, the species *A. lentiformis*

breveri was represented by only eight bushes located in a single ravine. Greasewood, plentiful on Catalina, was represented on Clemente by not more than a dozen shrubs on a single ridge of the Island's east side. And so it went.

One day, a month after our arrival, the archeologist came in with two acorns he had screened from an Indian mound. It seemed impossible that the husks could have remained intact through all the generations since the island had last been occupied by the aborigines. Still we had tramped over many miles of canyons and mesas and had

never once sighted an oak. It was several weeks later that we discovered the first oaks. There were about fifty trees in the group, the largest having a trunk measuring ten feet and six inches in circumference. We had been within a half-mile of them, dozens of times, proving how well secreted even large objects may be in a terrain as rough as that of San Clemente.

Later, we found oaks in many situations, the largest group being some thousand trees on the east side of Mount Cortez at about 1200 feet elevation. The trees were closely spaced and nearly straight of trunk. They were *Quercus tomentella*, a species confined exclusively to the Channel Islands and to Guadalupe Island. It is unknown on the mainland of either the United States or Mexico.

One of the loveliest trees on Clemente is the islay or Spanish cherry, *Prunus lyonii*. Round of head and almost perfect in form, it is densely clothed in glossy evergreen leaves, comparable in size and texture with those of the magnolia.

In May the trees were laden with long racemes of white flowers, the fragrance of which was carried for a considerable distance down wind. By autumn these flowers are matured into luscious purple cherries an inch in diameter and of a piquant flavor.

On the Island's highest, most exposed ridges, grew forests of ironwood. Oftimes these picturesque trees would seem to form in single file, and, like a legion of bent, avenging soldiers, would lead up and over the skyline in an endless march. The wood of this species is among the hardest known and it is said that, when properly seasoned, an arrow made from it may be shot through a pine door.

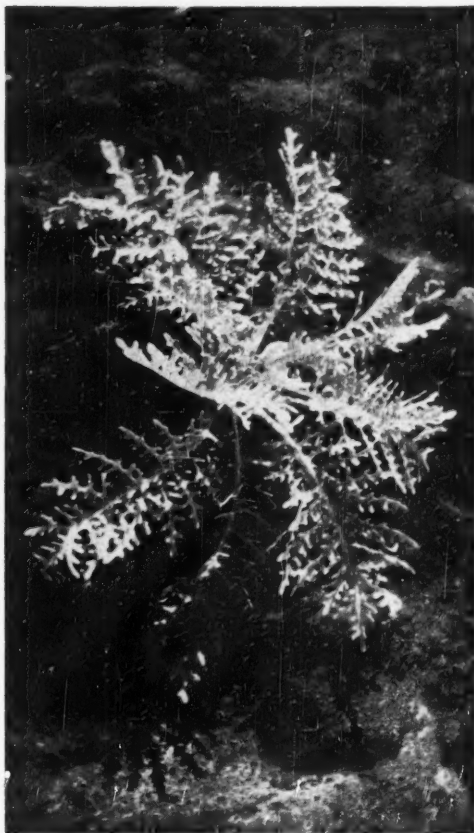
Other than the islay, ironwood and oaks, the island's

A variety of "Dusty Miller," *Erlophyllum nervinii* which is found on the Island in considerable quantity but is said to be indigenous to no other place in the world. These plants, which were as lacy as a fern and silvery white, grew in the driest and rockiest of locations where it did not seem there would be soil enough to support any type of growth.

only other large trees are the toyon, mahogany sumac and elderberry, all of which are well-known on the mainland. Except for the unusual size of the island representatives, they would be of no particular interest. Clemente's elderberry trees were the largest we had ever encountered, one near our camp being sixty feet in height. Incidentally, the elderberry is the only tree on Clemente that sheds its leaves in winter, just as the scarlet penstemon is the only shrub not evergreen.

During April and May, the broad, flat top of the Island is a golden carpet, visible several miles at sea. One of the two plants responsible for this unusual effect is *Lamarckia aura*, a golden-topped grass that covers hundreds of acres of the mesa. The other plant is the golden baeria, *Baeria chrysostoma gracilis*, which blankets the slopes so closely that the ground beneath can scarcely be seen.

It is typical of Clemente that these little daisy-like baerias, given good soil and sufficient moisture, would attain a height of twelve inches, with flowers the size of a fifty-cent piece. In dry, rocky situations, however, they would not exceed one or two inches in height, the tiny flowers measuring scarcely a quarter-inch across and limited, perhaps, to three petals. Whether a foot



tall or an inch, the same golden carpet effect was achieved. The same condition prevailed in the alfileria, known to California children as "stork bill."

High on the north and west sides of Mount Cortez, where it is either very hot or very cold, and extremes of flood and drought follow one upon the heels of the other, the alfileria covered acres upon acres of land. In this unfavorable environment an entire plant would frequently consist of a single leaf, not fully an inch in length, and one seed pod, which seemed to spring directly from the crown without benefit of stem. Every plant, I believe without exception, had this little, saber-like pod thrust, point upward, like a brave guardian of the painful inch the species had struggled to achieve on that dry, sterile mesa.

Quite a different spectacle was presented in the lush, fertile meadows of the east side. There we found many instances where the same variety of alfileria

Honeycombing the eastern and southern exposures of San Clemente Island are hundreds of volcanic blowholes. Many of these have been eroded to form caves into which the surf pounds at high tide.

All that remains of San Clemente's last *Lycium richii*, reputedly the last of its species to have been alive in the continental United States. The tree was popularly known as "banyan," its limbs having the habit of spreading, dropping to the ground's surface and rerooting.



had grown too tall to stand erect, and was creeping over the ground. Many of these stems were as thick as a man's finger, and a single plant often spread over a radius of six feet.

Vast areas of the Island were densely thatched with cactuses; opuntia, cane cactus and the viciously barbed choya, predominating. All too often our trail would end in a *cul-de-sac* of impenetrable spines. Most picturesque of the Island cactuses is the snake cactus, which hangs pendant on the canyon walls and gracefully drapes itself over the entrances of countless volcanic caves. We found it not uncommon for this variety to have a stem forty or fifty feet in length and nowhere larger around than a man's wrist. Scattered growth was found even in the glaring sweep of the dunes, where there was no semblance of soil, only free-running white sand, ever shifting with the play of the winds.

Most plentiful dune inhabitant was the *Franseria*, or burr weed, which spread over the ground like a plaster, its long, tough roots effectually imprisoning the sand beneath it. Lilac and cerise sand verbenas were likewise both enlisted in the cause of dune preservation. Always these plants were found growing on hillocks of sand, maybe four feet across, perhaps forty feet. It was not chance that had placed them on these hillocks; their intricate root system had retained the sand beneath them, while the rest of the dune had gradually blown away. We traced abronia roots on the surface fifty feet from the plant's main stem.

Except for its rarity, the fraternity of sand retainers would also include *Lycium frenontii* a variety of box thorn. These dense, thorny shrubs had formed an impenetrable thicket over the space of an acre at Northwest Harbor, but nowhere else on the island were they noted.

Another species, which for decades fought a losing battle with the vagaries of the dune, was *Lycium richii*. One specimen of this tree once grew on Catalina Island,

but, due to its extreme rarity, souvenir hunters avidly hacked chips from it until it fell by the wayside. This left the specimen on San Clemente standing alone, reputedly the only one of its species known in the United States.

I knew of this tree's existence for nearly fifteen years before I ever saw it. Then, after making a sixteen-mile hike to Northwest Harbor for the express purpose of viewing it, found that it had succumbed either to the elements or to advanced age.

The wood of the skeleton that remained was knotted and extremely hard. The trunk was about four feet around, and the twisted, drooping limbs covered an area of a hundred square feet, often dipping to the surface of the ground and again rising. This characteristic is responsible for its common, although erroneous, name of banyan.

Further exploration revealed the stubs of many other "banyans," undoubtedly long dead but well preserved in the hot, dry climate. A considerable forest of them may have once clustered there.

On the northern boundary of the sand dune we came upon the starkly simple little hut of Russian John, a hermit fisherman. He was cordial and hospitable, pressing upon us bread, boiled lobsters and water.

The dune was slowly enveloping his little domain. It had stolen forward like a thief in the night, until it lay heaped against the rear of his cabin. With every vagrant breeze, little siftings of sand stole into what he proudly termed his "front yard."

Russian John's most cherished possession was a tree mallow, *Lavatera assurgentiflora*. The lovely tree stood nearly twice his height, with a clean straight trunk. It was densely covered with huge, hibiscus-like flowers, deep red in the center and shading to rose on the edges. He told us that several years before he had found it growing wild at the edge of the dune near Seal Harbor; had rescued it from the sand and carefully transplanted it to his yard.

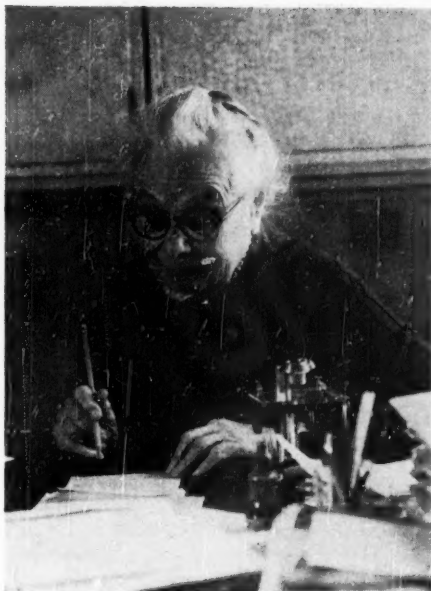
(Continued on page 392)

THE route to her work, in those long-ago years, ran down a cobbled street of a San Francisco hill. Other pedestrians hurried to leave that steep thoroughfare behind. Yet this strangely acting woman loitered, stooping to peer intently at the rocky paving, notebook in hand. Sometimes she dropped to her knees, looking into the gutter. Passing San Franciscans gave her a pitying glance.

In time a scientific journal carried a learned article on the flora of the Nob Hill cobblestones, signed by Alice Eastwood. Today, 57 years later, this recently "retired" curator of botany at the California Academy of Sciences still finds absorbing interest in a blade of grass, a weed, or a towering redwood. After nearly a lifetime studying flora of all kinds, and simultaneously winning fame as one of America's foremost scientists in her field, this little, white-haired woman still is awed by the "pyramiding wonders of Nature."

On her 90th birthday, at the insistence of friends, Miss Eastwood announced she was quitting her Academy position. But nearly every morning since then she has trotted briskly up to her old second-floor laboratory in an Academy building of San Francisco's Golden Gate Park, and has worked as hard as ever. Staff members are not surprised. "She'll still be doing it at 100," they say. The only concession to her age is a 15-minute nap after lunch and a taxi ride to and from her home, five miles away. Every minute lost from her life's mission disturbs her because "there's so much to be done."

"I've found the greatest imaginable pleasure and comfort in botany. Excitement, too," she says, blue eyes twinkling



COURTESY PACIFIC DISCOVERY

Alice Eastwood at her desk.

Alice Eastwood, Hardy Perennial

By NELSON VALJEAN

behind horn-rimmed glasses. "Why, identifying botanical specimens or unravelling the tiniest riddle of Nature is as thrilling as solving the greatest detective mystery on earth. To put it another way, one of the continuous marvels of our complex, high-speed age is such a simple thing as the germination of a grain of wheat or the unfolding of a rose bud."

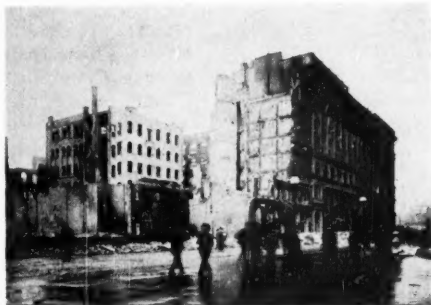
Born in Toronto, Canada, January 19, 1859, Miss Eastwood developed her first interest in plants when she moved as a girl to the flower-wonderland of Denver, Colorado. There, during school vacations, she walked over the picturesque hills, her mind dwelling more and more upon the rioting verdure. Before long she had pumped her teachers dry of their botanical learning. Soon the knowledge-thirsting girl was classifying flowers by herself, listing many little-known and neglected species.

After graduating from the East Denver High School, she underwent the broadening experience of teaching an almost unbelievable variety of high school subjects for the next ten years—Greek and Roman history, Latin, chemistry, bookkeeping, astronomy, physiology, zoology and drawing. Experience in art-work served her especially well in later life when called upon to picture plant specimens for publication.

Gradually her vacation trips lengthened until she had covered practically all Colorado and southeastern Utah. Usually, by preference, she traveled alone, seeking protection at night under some shrub or the branches of a tree. On most trips she dressed for comfort, but on one occasion, preparing to go with another botanist and a minister to a hikers hotel, she laughed at the au-

California Academy of Science building after the 1906 fire.

COURTESY PACIFIC DISCOVERY



Alice Eastwood's trips seeking new plants for the Academy collection carried her far afield.

dacity of a sudden inspiration.

"I always liked to travel light," she says. "Hated to carry luggage. So I put my nightgown in my bustle. No one dreamed, when we rested, that I was sitting on my suitcase."

Another day she was paid an unexpected call by a visiting Englishman, Alfred Russel Wallace, the famous naturalist who independently and simultaneously arrived at many of the same conclusions as Charles Darwin, and for whom the sea belt known as Wallace's Line was named. Would she go botanizing with him? She would, and did, and their climb up Graymount provided memories of his wisdom that still live like springtime. Now she knew for certain she would always follow botany.

In 1891, on a visit to California, she accepted temporary work with the California Academy of Sciences, then in downtown San Francisco. A year later she returned there to become curator of botany at \$75 a month, but often she dug into her own pocket to help pay assistants. And she continued to live her own life, little caring what others thought. In wet weather, she wore short skirts, a fearless innovation in those days.

Meanwhile, she was overhauling the botanical department—systematizing routine, alphabetizing the files, having lightweight, easily moved specimen cases constructed, "just in case of fire." It seemed almost that she foresaw the coming holocaust of 1906.

When the quake shook the city that year, Miss Eastwood refused to be panicked. Calmly she went from her home to the sidewalk in front of the California Academy of Sciences, on Market Street near Fourth. The front stairway was in semi-ruins; rubble was everywhere. Her first real pangs struck swiftly. What of her specimens—her wonderful plant specimens—up there on the sixth floor!

A male acquaintance, arriving on the run, helped her cross the debris on a scantling. There was a glimmer of hope. While the stairway marble had buckled and cracked, enough metal was showing near the bannister, she thought, to accommodate her small feet. She started climbing, crabwise, holding to the railing, rejoicing at endurance developed on mountain trips. Sometimes there was hardly room for a toehold. Chunks of marble came loose, crashed. Her shoes were scuffed to dinginess. She could hear pandemonium outside.

Finally, breath-taking minutes later, she was on the



sixth floor. From the window she could see flames only a block away. Fire-fighters, on the roof of the nearby mint, were battling falling sparks. But her specimens were safe!

Moving methodically, she shifted and opened the specimen cases, and gave thanks for their lightness. Swiftly she ransacked the more important files, and tied up plant types with bits of string and rope she had saved in the face of ridicule.

When her friend arrived at her side, she was knotting together other pieces of string and rope. Asking her companion to lower the laboratory treasures from a window, she returned to the street to receive them. This done, she providentially found an expressman and explained her need of transportation.

"Cost you a heap!" the man warned.

She agreed without betraying the slimmness of her purse. With her goods loaded on the wagon, she took a seat beside the driver and rode with him to temporary safety, just ahead of the flames that gutted the Academy building. At her home she talked her helper into carrying the heaviest loot to the front porch; then apprehensively asked charges.

"Miss," the expressman said with a grin, "for anyone with your spunk—three dollars." And he could have demanded a king's ransom that day! The last she saw of him, this knight was galloping away into the smoke.

Later, when the fire advanced on her home, Miss Eastwood fled again with her specimens. Then came an enforced vacation. The burned-out Academy now could do no more than plan for the future. Miss Eastwood used this period to dash away on tramping and horseback explorations throughout the West, and to the Yukon, Mexico and Lower California. Anxious to study the collections of early scientific explorers of Western and North America at the Kew Gardens, she went to England.

But when the Academy's new buildings were completed in Golden Gate Park in (Continued on page 392)



The flicker spends much of its time on the ground, its favorite dietary item being ants, but it seeks a tree as a site for its home.



With its downy plumage, the hairy woodpecker looks comfortably warm as it feeds in the middle of winter on insects lurking in the tree.

Woodpeckers: Good or Bad?

By JOHN F. WILSON

WHAT about woodpeckers? That question was forced upon me as a lad, when an all-engrossing interest in wildlife possessed me, as it does most boys. I was studying when the rhythmic tapping of a woodpecker outside my window interrupted, and I heard my father call to our next-door neighbor: "Bring your gun over here for a minute, Harry!"

Hurrying outside, I found my father pointing at a downy woodpecker, still drumming busily, high on an elm. "Is your aim good enough to get rid of that pest?" Dad asked. The answer was the crack of the rifle and a flutter of earthborne feathers.

Were they right? Was the woodpecker a menace to trees and so should be destroyed at every opportunity? I did not know, but I hated the killing of wildlife without cause. So I asked if woodpeckers were bad.

"Of course they're bad," my father replied, as though annoyed at a foolish question. "Do you think it's good for a tree to be punched full of holes?" I remember wishing that I knew what to say, and saying nothing. With the offer of his further services, our

neighbor, always eager for a target, returned to his cottage.

Here, then, was my father, a man of practical mind and kindly nature, and a neighbor hunter, both bent on killing every woodpecker that met their eyes. It seemed useless to argue, for the evidence seemed all against me, and I certainly was a minority. But I was not convinced, for even then I had seen that men's understanding and treatment of wildlife was far from perfect. Besides, I think my faith in Nature was too strong to be subdued.

It would be impossible to observe a woodpecker without sensing its live, almost human, interest in life. It seems, for instance, to delight in producing sounds with its bill. I recall one bird enthusiastically hopping about at the top of a telephone pole, "playing" on a row of glass insulators. Perhaps to study woodpeckers seriously you should first discard your sense of humor.

Early I discovered that the very name woodpecker is against the bird. Once my hostess at a dinner party, glancing out the window, noticed a large, brownish bird on her front lawn. "Look!" she exclaimed. "What



A pileated woodpecker produced this pile of chips. This bird is a prodigious worker, especially in winter, when food is scarce. At the right, a young pileated woodpecker. Although a youngster, he is a big fellow.

kind of bird is that? It's beautiful!" Although she knew nothing of birds, she was all enthusiasm.

"A flicker," I replied, and then explained that it was a species of woodpecker.

"Oh, then I hope it doesn't live around here," she said, looking anxiously at her pet shade trees.

The woodpecker does what its name implies, and is amazingly efficient about it. Its neck muscles are like springsteel; its beak is like an all-purpose tool that can gouge, split, chip and pry. At work the bird displays a remarkable tenacity of footing, and, by using its tail as a brace, it becomes almost one with the tree.

To these attributes for its life's work, a woodpecker adds an intensity of purpose that is amusing to watch. The various species, of course, display different characteristics, which contributes immeasurably to their interest, but their attitude is universal.

The downy woodpecker is typical. Led by the gentle taps of its bill, we discover the bird perched quietly on the trunk of a tree, seriously and patiently working like a carpenter with his chisel. Downy's actions are rapid but, looking closely, we see that they are also deliberate. The beak strikes and draws back like a flash. The head turns to one side, then the other, bringing each shining eye in turn to view the

bark. Thus the bird continues throughout the day, with rest only when its work is done.

It is this studied persistence that the woodpecker brings to its work that can so disturb those who value their trees. Moreover, the holes that are dug are in common view, and, when we begin looking for them, they seem to multiply tenfold. There is a pine tree a stone's throw from my window with ten or more large cavities. In the woods we find holes of trees completely gutted, with piles of chips lying at their base. Telephone poles are obviously convenient houses. And some trees are almost completely honeycombed with small holes. It is alarming.

But it is a luxury to jump at conclusions, and our observations have only begun. The first thing noticed is that the majority of the holes are in dead wood. However, since the birds have often been seen beating their loudest tattoos on living trees, the question arises as to which came first, the hole or the dead tree.

The truth is that the woodpecker is an industrious chap, but not a foolish one. It does not make a point of excavating the hardest wood it can find—soft, dead wood in his preference. Consequently, the holes discovered are usually in dead trees, or decayed, unhealthy parts of living trees. Of course, we find holes in living hard maples, apple trees and so on, but they are in the minority.

This preference is not without its repercussions, as telephone companies well know. Their poles are made



to order. And more than one farmer has found holes in his icehouse walls, where a woodpecker has lodged himself in the sawdust between the inner and outer walls.

Clearly, though, the woodpecker is not the wholesale destroyer of trees that we might have supposed. Of the comparatively few nests dug in living trees, only a small percentage are fatally injurious. So the chief worry about woodpeckers is unfounded.

Our interest, however, is whetted. Since he can make a nest in one to three weeks, why his incessant pecking? And when irate fruit growers expound on the damage that the red-headed woodpecker, for instance, inflicts on their crops, and when a public utility company is obliged to appoint an official woodpecker exterminator to prevent damage to its poles, what are we to think?

Since the prime occupation of any bird is the search for food, a study of the woodpecker's feeding habits should explain much. There sits a hairy woodpecker. If he does not see us first and scurry to the far side of the tree, we can watch what is going on. Clamped firmly to the tree, he is delivering repeated blows at one spot, trying to dislodge a deeply hidden grub, known as a borer. If we were close enough we could see that, when the tunnelled grooves in which the borer lives have been exposed, a long slender tongue darts in. The hairy, like the downy and some others, is specially equipped for this beneficial work. Barbs on its tongue convert this organ into a miniature spear, which may be hurled two inches or more beyond the tip of the beak to reach the most elusive of insects.

Again, we might notice the bird as it works steadily on a dead stub of oak, pulling out small white grubs and borers. Like the others, it frequently uses its beak as a lever, driving it up under a piece of bark and then prying it loose. The uncovered semi-rotten wood usually yields ample insect food.

Most wooded areas will reveal the mammoth diggings of the pileated woodpecker. Ants are its chief food, and in its search for them the pileated cuts the great furrows so conspicuous in the boles of dead trees. The heartwood exposed usually proves to have been penetrated by the labyrinthine passage-ways of the great carpenter ants. This woodpecker also rids living trees of destructive colonies of ants, and we can only marvel at the bird's ability not only to select the proper tree, but to sink a hole to the heart of it with such precision as to tap a thriving community every time.

The gay, frolicsome, red-headed woodpecker does not confine itself to insects, but feeds on many cultivated fruits as well. This has given the bird a bad name among farmers, which can be understood. But the red-head also destroys many insects, notably beetles.



The showy red-headed woodpecker demonstrates the way it uses its tail as a brace for its work.

A red-head feeding its young was computed to be destroying insects at the rate of six hundred per hour, and seemed to work incessantly.

The bird's habit of storing nuts for winter use provided an amusing incident for one observer. Finding a hole to its liking, the red-head began driving in acorns. But the hole was bored straight through the pole, and as the bird drove one in, another would drop to the ground. It seemed the red-head knew something was wrong, but was unable to reason it out. Chattering agitatedly, it would hitch around the pole to examine the other side, then give up and go for another acorn.

The flicker, which had provoked the concern of my hostess for her trees, is, in reality, the most terrestrial of all woodpeckers, and pays relatively little attention to trees. More than any other bird, it dines on ants, and these frequently form forty-five percent of its diet. One stomach examined contained more than five thousand ants. The flicker explores the ground, scratching away leaves or rubbish to locate the nests, and then, digging into them with its long bill so (Continued on page 395)



A gopher tortoise near the entrance to its burrow.

Gopher Tortoise

By BOB GORDON

Photograph by Brooke Meanly

AMONG Nature's old standbys in south Georgia is the gopher tortoise, *Testudo polyphemus*. Its common name has reference to the pocket gopher, a mammal that spends most of its life in its underground tunnels. The tortoise does likewise, and its very shell and limbs are indicative of its life habits.

The shell is high and flat on top; the head, blunt and rounded. The limbs are very strong, and the hind ones, more especially, remind one of an elephant's. All limbs are equipped with stout, blunt claws. These enable the tortoise to excavate his retreat.

The color all over is a dull brown, and the skin is wrinkled. The maximum length of the animal's top shell or carapace is about fourteen inches. The tortoise is herbivorous. It eats plant life, and thrives in captivity on lettuce and almost any other green vegetables given it. It does not require much water. This tortoise does some injury in gardens where it occurs. According to Clifford L. Pope, turtle authority, it ranges "from Edgefield, Aiken and Barnwell counties of South Carolina, southward through southeastern Georgia, central Florida, and westward along the Gulf coast to the southeastern corner of Texas." Stejneger and Barbour state that it reaches southern Arkansas in the Mississippi Valley.

Fossils found by scientists have shown that this reptile has been in south Georgia and Florida for

thousands of years, although now not as numerous.

Colonial in nature, these tortoises choose the dry, sandy, pine barrens in which to dig their burrows. We entered such a place in Wilcox County, Georgia. All over the hillside, roughly twenty feet apart, were mounds of sandy clay, each one indicating a burrow.

The burrows of the gopher tortoise are in the shape of a transverse section of their shells. The length and depth of them depends entirely upon the degree of dampness of the soil. They must lie above the water-table, but in soil having enough moisture to facilitate the digger's work. The people around gopher country say that one can tell the length and depth of the burrow by the dirt thrown out to form the mound in front of the burrow. This is not always strictly true, since much of the loosened dirt is pressed against the side of the tunnel, thus helping to protect it, and also lessening the amount of dirt to be thrown out. The burrow ends in a sort of room, large enough to permit the tortoise to turn around. Examining one of the rooms proved most interesting since the gopher tortoise is not the only occupant. Pope calls these rooms, "Nature's flop houses." Each room generally contains at least one gopher frog, *Rana capito*, which gets its name from the original inmate, the tortoise. Occasionally a snake or two may be found there, for it is also the nesting place of several (Continued on page 394)

A black and white photograph showing a hand holding a glass of water. The hand is positioned over a faucet, and the glass is tilted slightly. The background is a plain wall with a faucet and a sink visible.

Our Glass of Water

By EDNA CAMPBELL BARKER

Water Biologist, City of San Diego

We are inclined to take the glass of water that we casually draw from the water tap as a matter of course. Behind it lies complicated effort to keep it clean and thirst-quenching, safe from both dangerous bacilli and from strange odors and tastes. This task must be performed today in the face of pollution of streams by man, who has abused his resources of water tremendously. In this article, and in the pictures that follow, is given an indication of the problem of water purification and use.

PHOTOGRAPH BY ROSS W. REYMAN

HAVE you ever thought that the water you drink may have come indirectly from the most remote spot on the globe? It is startling, but true. More than three-fourths of the earth's surface is covered by water, most of it salt. Part of this water is evaporated by the sun and lifted high into the atmosphere as a transparent vapor. Winds transport this vapor, which may travel vast distances. On cooling, the vapor condenses into clouds. It is only in this form that the water is pure.

When the water falls to the earth, it absorbs nitrogen and oxygen, and holds in suspension minute particles of dust and smoke, as well as any bacteria that may be floating around. If the precipitate of moisture is heavy, some of the water will travel downward by gravity to reach an underground place of storage. These underground storage basins are Nature's own reservoirs of indefinite age. They are called "ground waters," and are usually clear from long percolation through various layers of soil and soft rocks. They take on the mineral qualities of their passage-ways and are usually harder than surface waters.

However, the water generally used in our cities is "surface water." It also originates in the clouds, and when it falls on hard ground, or rocks, it flows in a horizontal direction over a level or inclined bed. Little streams join larger ones as they seek to return to the

ocean. But man has found a way to delay this return. He has built, and will continue to build, reservoirs for the impounding of water.

Engineers endeavor to locate reservoir sites in sparsely populated catchment areas. After the dam is constructed, there may be a wait of several years before the water is put into service. In the meantime, there is a progressive growth of aquatic vegetation in and around the edges of the reservoirs. Fingerling fish are stocked. The reservoirs are much like natural lakes. All these things may be seen when the reservoirs are visited.

But there is another world of life in these reservoirs, which is scarcely perceptible with our unaided eyes. In the surface layers of these freshwater bodies may be found our original floating population. They are minute plants and animals known as "plankton," from the Greek, meaning "wandering." While many of the little animals are free-swimming, they cannot swim far because of their size. There is a great variety. Some of them are composed of but one cell, while others have many cells. The one-celled animals are known as Protozoa. Some of the Protozoa move by flagella or cilia, and feed upon bacteria. These bacteria are the lowest type of plant life in the water. Some of the Protozoa even feed upon small rotifers, which are many-celled. The larger rotifers may eat the smaller ones.



More often than not the water filtration plants being erected today are beautiful buildings, architecturally attractive, neat and clean in themselves and their surroundings. This is as it should be, since these structures are symbolic of the effort of the community to keep its water supply clean and safe and potable. This is an architect's drawing of the Alvarado Filtration Plant of the City of San Diego.

At this point, if not before, the reader is apt to ask, "Do we drink this water with all these organisms? If so, I'm going to drink tea!" Have no fear; our filtration plants are able to strain them out. But it would not hurt us if we did drink a few of these plankton organisms, for they are harmless to humans. We just do not like the odors they provide when they are concentrated.

It is true that some bacteria find their way to the reservoirs, but the ones harmful to man do not find the cool waters conducive to growth, so they die. Others are eaten by the Protozoa. However, to be sure that the water is safe, daily bacteriological examinations are made of water from entry points, using procedures recommended by the American Public Health Association. Examinations of untreated water are also made at suitable intervals. Bacteriological examinations are made to determine the presence or absence of coliform organisms. Armed with the results of these examinations, the sanitary engineer is enabled to direct the correct chlorine treatment of the water, which is necessary for sterilization. The observance of these procedures throughout the United States has brought about a great advance in health during the first half of the Twentieth Century. At the present time, an epidemic of typhoid fever traceable to public water supplies, is a rare occurrence.

But the water works men are not satisfied merely to make the water safe for our use, they also seek to deliver a palatable water. To control the tastes and odors, biologists are employed to make weekly examinations of the reservoir waters. When filters clog, due to excessive growth of plankton, it is the biologist who identifies the organism and estimates the quantity present so that the sanitary engineer may know what dosage of bluestone, the corrective, may be necessary.

The blue-green algae, which grow more abundantly

in the warm months of the year, have been called "water bloom" organisms because the colonies may grow large enough to be seen without a microscope. Several of them are shown on the following pages.

Two pictures of diatoms are shown, single-celled plants with a yellowish-brown color. *Melosira* appears to be a filament. However, each cell is a single plant held together end-to-end by a gelatinous material produced by the cell. Both of these diatoms are troublesome when in large numbers. Spring and fall are the seasons when high counts may occur.

Ceratium is a one-celled organism with portions of its cellulose walls extended into long horns. It commonly increases by division. Large numbers of these organisms clog the filters. All of these organisms, when abundant in our reservoirs, suggest bluestone treatment.

A very interesting rotifer to watch under the microscope is the *Asplanchna*, of which three pictures follow. Specialized organs are protected by a transparent, tough covering. It is unique in possessing a pair of jaws resembling forceps. This enables it to snatch its prey swiftly.

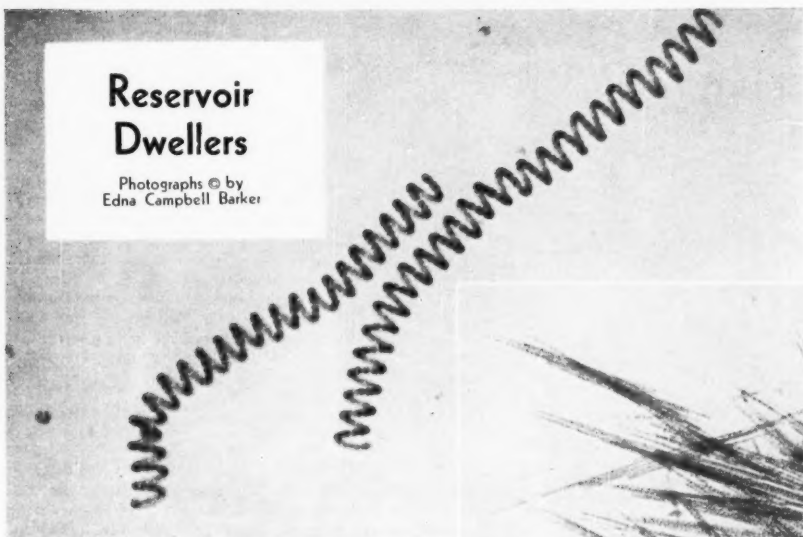
One of the water fleas is known as *Scapholeberis*, and it and other water fleas are a valuable source of food for young fishes. This species is generally found among weeds in reservoirs, lakes, and ponds.

Cyclops are also a valuable food for fish in our reservoirs. They are found in all fresh-water bodies. Unlike the water fleas, the young hatch out into a larval form called nauplius. After several molts, the adult form is reached.

Anthophysa, shown attached to *Cyclops* nauplius, is sometimes found in large quantities in a reservoir. It is a flagellate protozoan. The pedicels are usually brown in color and greatly branched in an irregular fashion. The heads have a tendency to separate from the stalks as they mature. Now see them pictured.

Reservoir Dwellers

Photographs © by
Edna Campbell Barker

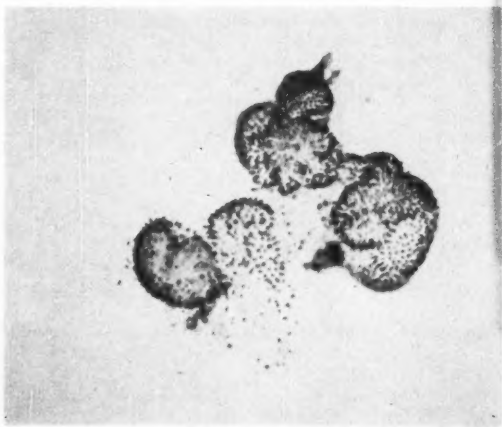


Above we have *Anabaena*, a blue-green alga that floats on the surface of water in the form of spirals. Their shape suggests heavy springs that might hold a screen door in place. Sometimes the coils are short, and then they suggest alphabet soup, except for the color, which is a dark olive-green. Enlarged 100 times.

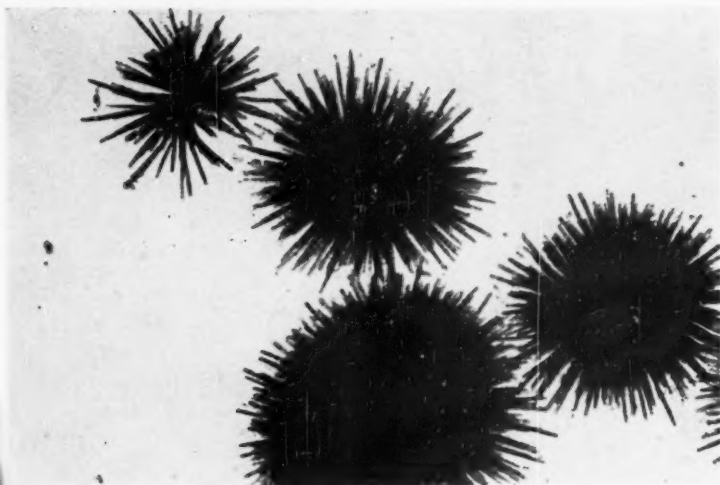


Above, right, is *Aphanizomenon*, another blue-green alga familiar to water-works men. The colonies are made up of slender filaments, laterally joined together. When examined with a pocket magnifier, they suggest bits of chopped hay. Enlarged 100 times.

Below is *Microcystis*, an irregular blue-green alga. The cells do not divide in any regular manner. The sheath surrounding the colony is so transparent that it does not show in the picture, and is not always discernible under the microscope. The colonies may grow large enough to be seen with the unaided eye. Enlarged 100 times.

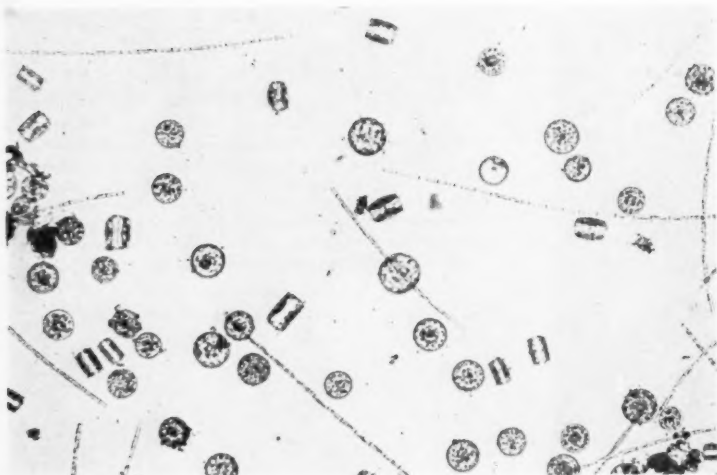
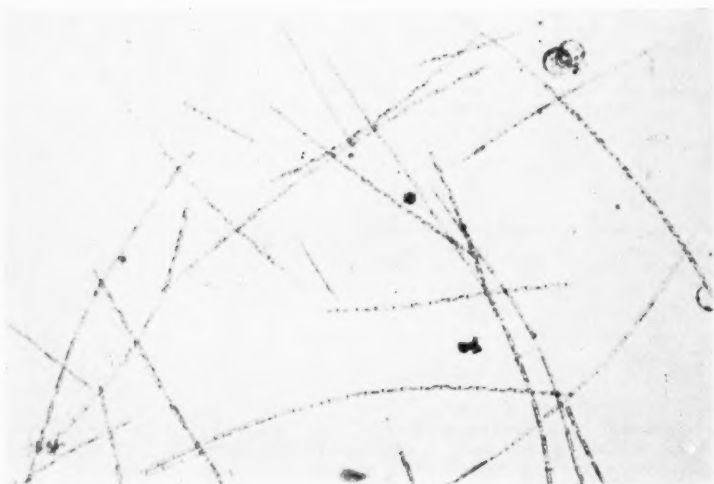


Coelosphaerium, above, is another blue-green alga with small cells. The confining sheath has broken, and new, smaller colonies are forming. This is another one of the important "water bloom" organisms. The gelatinous envelope may usually be demonstrated under the microscope. In this species, the cells are somewhat pear-shaped with the broad ends outward. There is only one layer of cells in the colony. Enlarged 100 times.

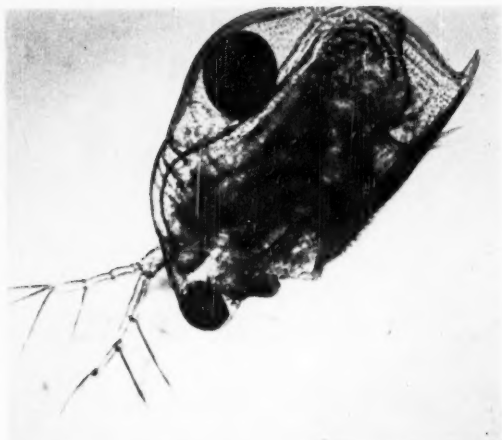


Gloeotrichia is one of the blue-green algae with tapering filaments enclosed in sheaths, which blend together to form hemispherical balls large enough to be seen with the unaided eye. They float on the surface of the water. In the picture the small plant at the top shows more detail. As the plant grows in size, the colony becomes denser and detail is lost. Enlarged 100 times.

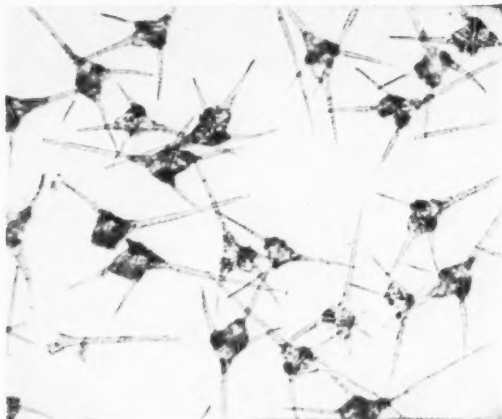
Here, right, we have several filaments of *Melosira* and a few cells of *Stephanodiscus*. A high count of this diatom in the reservoir water demands the use of bluestone treatment to correct the odor and taste of the water.



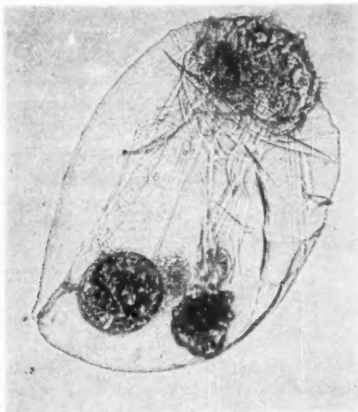
Here, left, is a group of organisms — known as *Stephanodiscus* — which are suggestive of gold coins in their valve view. They are unicellular plants called diatoms. A portion of the cell wall consists of silica, and, after the plant dies, the fine markings of the silica shell are clearly seen. *Melosira* is also shown in the photomicrograph. Here the individual cells are joined end-to-end in the form of a filament. There are no specialized cells, as in some of the green algae. Enlarged 100 times.



Scapholeberis is a little water flea, a crustacean. A large egg is seen within the dorsal, arched portion of the shell, which covers the internal parts of the organism. The shell is partly open at the posterior and on the ventral side. There are two antennae, one on each side, moved by powerful muscles in the head. These are the chief swimming organs. The tips of a pair of claws show on the ventral side. The flea feeds on algae. Enlarged 100 times.



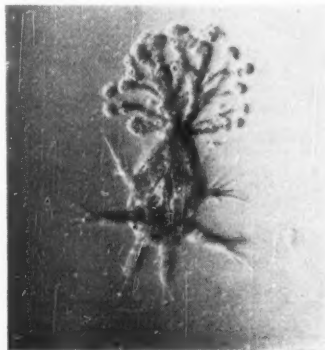
Ceratium is a one-celled organism moving by flagella. It is one of the fresh-water *Dinoflagellates*. The walls are composed of cellulose, and are usually yellowish-brown or greenish-brown in color. Across the body, a transverse groove is seen. One end of the flagellum (whip-like process) rests in the groove. The flagellum is pale in color and is not often noted under low power magnification. The organism moves jerkily, sometimes overturning. Enlarged 100 times.



Here are three pictures of *Asplanchna*, one of the large rotifers. These rotifers are scavengers; and, if we could propagate them fast enough, we might be able to kill off some of our smaller organisms, such as *Ceratium*, without benefit of bluestone. Center, we have an adult female. The embryo is in the shape of a small ball within the posterior end of the animal. A few cilia of the corona are seen at the anterior. These cilia set up currents and draw small organisms to the rotifer. In the picture may be seen the interior organs and the network of muscles controlling them. Left shows an adult female carrying an embryo within the posterior end, transversely placed with the anterior of the embryo toward the left ready to emerge. Under the microscope, one may observe the movements of the struggling embryo clearly. Right, we have a beautiful young female with several embryos in various stages of development. She is exceptionally clear.

One of the commonest organisms found in fresh-water is the *Cyclops*. It fairly leaps through the water. It has one eye and several pairs of swimming feet. At the left is a female carrying the egg sacs. When the egg hatches, the young animal has only three pairs of appendages, all of which are

used for swimming. At the right is *Cyclops* in a nauplius stage, as the early stage is called. At the posterior end is a marvelous arrangement of one of the flagellate protozoa, the whole giving the impression of flowers. However, what appears to be petals are tiny, one-celled animals, each with two flagella. The branched stalks are attached to the young *Cyclops*. This arrangement of *Anthophysa* has been observed by the writer only this one time.



Pigeons of Passage

A Pictorial Record

By NETTIE
WOLCOTT PARK



This is the elephant folio, copper plate engraving by Havell after the drawing by John James Audubon. This color plate brings \$275 in today's market. The male bird is numbered 1, and the female 2. Audubon captured the fluid grace of the bird's body and the iridescence of its plumage as no other artist has ever done.

My interest in "wild pigeons," those long-tailed birds whose flights once blackened our skies like clouds, goes back to my trundle bed days in central Michigan in the middle nineties.

Father, an amateur naturalist, was deeply concerned over the plight of the pigeon, even then nearing extinction. He would tell me stories, some of which had to do with the gregarious "wood dove," as it was called locally. When he told of how the bird had been persecuted by man — trapped, shot, netted, knocked off its perches with poles — until it had well-nigh disappeared, I decided that just as soon as I grew up I would do something about it. I was all of five years old, and I conceived the plan of catching a few pairs of the pigeons, giving them a patch of woods — maybe our sugar bush — building a chicken wire fence around it and almost up into the sky, and letting them raise their babies in peace.

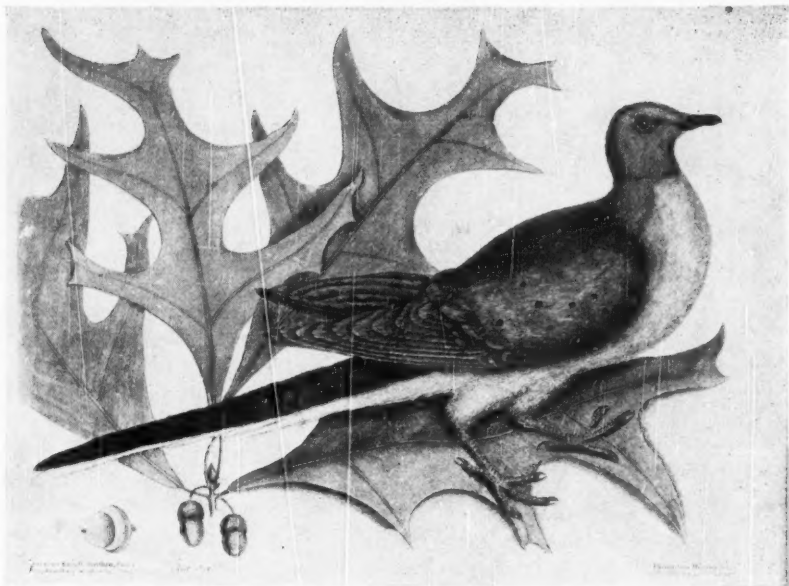
Every time I went to the woods with Pa or the boys thereafter, I would watch for a glimpse of the passenger pigeon. It is a habit that has brought me much grief over the years in the form of bumped shins, skinned elbows and nose. One cannot keep his eyes on the trees above and his toes out of root snares below, at the same time. Even

today, I still look. Repeated and inevitable failure sent me off on another quest. If I could not have the pigeon in the flesh I would have every blessed print, or painting, or water color of it I could lay my hands on.

This quest, I found, was almost as hopeless as that for the bird. It is amazing, considering their vast numbers, how few artists depicted the pigeon. Probably they were contemptuous of it, having that very human trait of thinking the usual of small importance. I surreptitiously tore out of my father's books on natural history every picture of the pigeon I could find — the second 8vo Audubon, the Wood, the Lydekker — but there my collection stopped.

When, years ago, I joined the staff of Harry Shaw Newman's old print shop in New York City, I stumbled into a bonanza. In addition to this source, I have, for sixteen years, scanned every wood-stipple-steel engraving; every etching, aquatint, lithograph, mezzotint, water color, wash, gouache, oil that has passed my way, hoping to meet my friend, Mr. Pigeon. And now and then, sometimes with months, and again with years between, some artist's conception of him has come along. On these pages are the results of my searching.

This is probably the rarest of all prints of the passenger pigeon. It was executed by Catesby, about 1732. He was an Englishman who came to Virginia in 1712, collecting plants. Returning in 1722, he set out to compile an illustrated work on our natural history, later learning the art of etching to do his own plates. This plate appeared in his "Natural History of Carolina, Florida and the Bahama Islands" and was the first work of any importance on American birds. His knowledge of the pigeon was scanty, but he did show it against a pattern of oak leaves and acorns, which, with the beechnut, comprised the greater part of the bird's food.

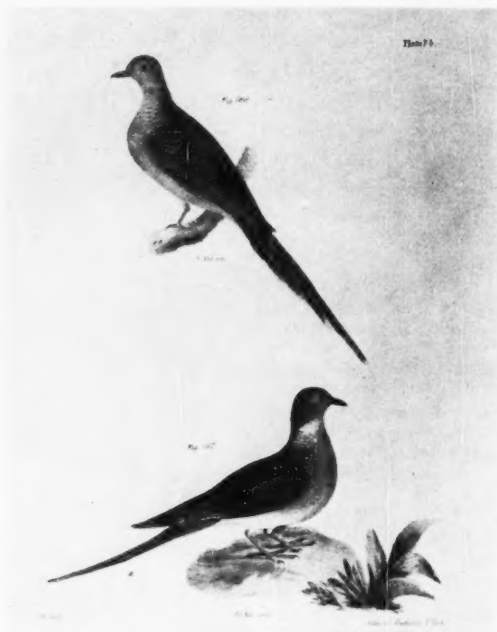


This print is a small folio Currier and Ives rarity, entitled "The Puzzled Fox". One is invited to find the horse, lamb, wild boar and mens' and womens' faces. Also there are the passenger pigeons, which the fox is supposed to be figuring out how to catch, not a difficult task since the birds were noted for their outstanding stupidity.



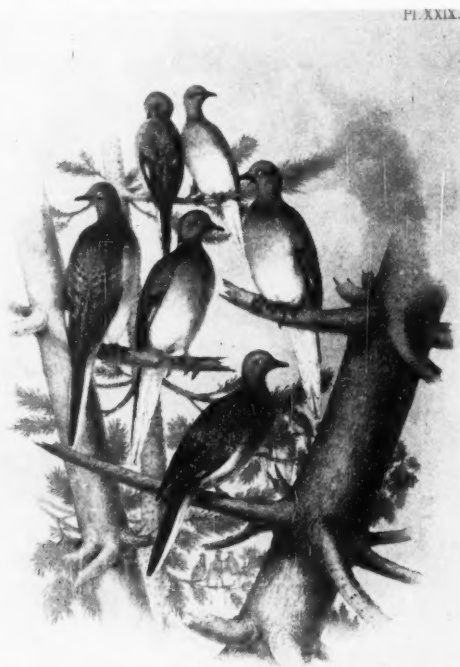


This is an engraving of the passenger pigeon made by Lizars, after a drawing by Captain Brown, made in 1834. This is an evident "steal" from the Wilson plate (below), but is an interesting addition to the collection of pigeon illustrations. Lizars also engraved the famous turkey cock and hen for Audubon, and did seven or eight others from the Audubon originals, although these were retouched by the engraver Havell.



A small folio lithograph by Endicott after J.W. Hill. The latter engraved the famous Hudson River portfolio, while Endicott was a contemporary of Currier and Ives. The original is in color. Below is a small folio lithograph by Theodore Jasper in 1873. This is particularly interesting from an ornithological point of view because it shows the broken limbs of trees, which snapped under the weight of the numbers of pigeons in the days when they were most numerous.

Small folio engraving made by Warnicke after the drawing from Nature by Wilson, who was America's first ornithologist, preceding Audubon by several years. The original is in color, and Miss Park early added this to her collection of passenger pigeon pictures. It was given her by Harry Shaw Newman soon after she became associated with his old print shop in New York, from which vantage point she kept a lookout for more subjects



A.F. Tait was able in drawing the pigeon, as is indicated in this large folio lithograph entitled "Playing the Decoy" and brought out by Currier and Ives in 1862. Frank Forester is in the blind, and the picture shows a favorite method of luring the pigeons within gun range during the 19th century. Study of the live decoys on the man-made stub of a tree reveals real mastery of the painter's art.



This is one of the very few pictures in which a cloud of passenger pigeons is shown. It is an engraving in aquatint by William Daniel in 1809. While it may be a bit on the fanciful side, it does carry out the thought of the great clouds of birds that are reported to have darkened the skies in their flight.



The sunbonneted girl riding side-saddle in this Kollner lithograph, which is entitled "Scenes in the Country", is evidently on her way home from market, possibly in Philadelphia, with a dozen or so pigeons tied to her saddle. One wonders whether she will serve the birds in fricassee or in a pigeon pot-pie.



"Mating Call" by Clifford Matteson of Buffalo, New York, was judged best in the color section and first in its class by the Jury of Selection in the Eleventh International Salon of Nature Photography conducted by "Hobbies," the Magazine of the Buffalo Museum of Science, in May, 1949.

Wildlife Conservation

LET'S Pass the Ammunition" was the theme of one of the sessions at the recent annual meeting of the Izaak Walton League of America in Denver. Representatives of several national conservation organizations presented statements of their views on conservation and offered cooperation in achieving common goals. Speaking for the American Nature Association, we pointed to the many phases of conservation—pollution control, park and wilderness preservation, sound forestry practices and similar problems—on which we stand in complete agreement with other groups. We have been passing the ammunition for years, and will continue to do so in the interests of sound conservation.

However, we pointed out, "there is one phase of conservation on which we cannot always follow the 'party line' of perhaps the majority of conservation groups!" This, we said, is wildlife conservation, since "our first interest is in wildlife for wildlife itself; as a part of life and not principally as a target."

Since this statement represents a statement of policy, it seems appropriate to quote it in this editorial column. Continuing, we said:

"Although we have no interest in promoting it, we are *not* opposed to hunting if it is practiced according to the rules of true sportsmanship and with proper regard for the interests, rights and enthusiasms of the larger body of non-hunters. We do not think that such true sportsmanship obtains today except with a minority of licensed gunners. Unfortunately, the Izaak Walton League, the Wildlife Management Institute, The National Wildlife Federation, and others of the better-informed and better-led sportsman's groups still speak for a minority among those who find sport in hunting. There is yet far too much wildlife administration that takes into first consideration the task of keeping the gunner happy. We think that fish and game departments that ardently promote the sale of more and more licenses to get more revenue are doing a disservice to wildlife conservation; that most of the opulent hunting and fishing magazines, by zealously stimulating more and more hunting, are contributing to a gunning load with which sound wildlife management cannot keep pace. An occasional gesture toward conservation by such publications does not offset the overwhelming mass of text that glorifies the hunt and hunter.

"Wildlife conservation is the most controversial of all the parts of the conservation picture. This is because hunting is the most selfish of all the assaults upon our natural resources. There are more moral and ethical considerations involved—and often carefully ignored. Also, it is the only recreation that depends upon

destroying life for its enjoyment. Naturally, therefore, it generates more heated differences of opinion, and more intolerance. The non-hunter cannot understand why so many hunters, seeing a duck or quail or a rabbit out of season, first gives utterance to the thought, 'Boy, if I only had a gun!' And the hunter, more often than not, cannot understand why the non-gunner would rather see the duck or quail on the wing and alive, or the rabbit high-tailing it for the underbrush. Certainly these extremes of view—and there are many in both camps—can never be completely reconciled. And they certainly cannot if more and more incompetent hunters, ignoring property rights, shooting at anything that moves, violating the laws of decency and sportsmanship, are urged to get a gun and a license, and become red-blooded he-men.

"We have had a good deal to say about this gentry, and good sportsmen are beginning to say more and more about them, too. When we say it we are clocked up as blue-noses, however; as advocates of laws that will hogtie all hunters. That could eventually be the result, if there is anything left to hunt by the time sufficient public opinion is aroused. If such a situation is going to be avoided, and free hunting in America is to continue, it is going to be up to the sportsman himself. He must enforce sportsmanship, with the butt end of a rifle if necessary, and for his own good. If every good sportsman were an enforcer of law and of decency the picture would be different. Let any golfer try to get away with moving his ball from behind a tree, or improving his lie in a sand trap, and he will hear plenty from the other players. Some of that technique could be applied by hunters to fellow hunters.

"So, as far as wildlife conservation is concerned, the American Nature Association will string along with the birds and mammals, *first*. We will look askance at poison programs, at 'vermin' drives too often promoted as a means of shooting out of season, at alarmist reports of wildlife damage designed to achieve the same result, at bag limits and regulations designed to keep the hunter out of the administrator's hair. Frankly, we believe, that, in so doing, we are not only serving the interests of those who enjoy wild birds and mammals alive, but the interests of those who find sport in shooting.

"Finally, we hope that conservation, in every respect, will never cease to involve controversy. If it ever should, and there is no danger that it will, it would cease to offer stimulating and dramatic goals. And, despite discouragement, and one problem after another, we think we are becoming stronger and more effective as we become broader, more understanding, and more willing to pass the ammunition—and use it."



PHOTOGRAPHS BY PAUL DAVIE

A group of high school juniors wait their turns for attention from the friendly chickadees at "Wild Acres," the sanctuary run by Paul Davie at Wellsville, New York. Right, Shirley Horn watches with rapt expression the chickadee in her hand.

Small Sanctuaries Are Fun

By EDNA HEWES McMURTRY

MORE and more people are becoming aware today of the need of the conservation of our great natural resources of land, forests, water, and wildlife. *Road To Survival* by William Vogt and *Our Plundered Planet* by Fairfield Osborn have driven home the message to a growing legion.

Too many people have the idea, however, that conservation must be accomplished in terms of large units. This, in one sense, is true, but on the other hand, we can all have a part in a smaller way, and must if we are going to attain our goal. Many, also, have been discouraged by claims that the small sanctuary owner is

handicapped from the very beginning, that the odds are against success.

Small sanctuaries are fun, however, and more often than not can be managed to the satisfaction of all concerned. Paul Cory, in his book, *Buy An Acre*, says: "Developing an acre is the best way to live creatively and excitingly." This acre, he explains, will mean hard work, but what worthwhile thing is all play? Some successful examples show what can be done.

Paul Davie, a Wellsville, New York merchant, began his outdoor interest by reforesting thirty-five acres of land in Scio, New York, in 1926. It was the first project of its kind in this area, and from this grew the idea of his wildlife sanctuary, Wild Acres, which he began in 1941. Some 16,000 trees have been planted, including red and white pine, northern spruce, larch, and Scotch pine. For wildlife food and cover 2000 shrubs have been set out. Most of this has been done through the aid of the Soil Conservation Service district manager in this area, Robert Reed. There are many of these districts now,

HORNELL EVENING TRIBUNE PHOTOGRAPH



A group of Camp Fire Girls ready to start on their tree planting project on the sanctuary at the camp near Hornell, New York.

and their managers are willing to help the small land-owner who offers the opportunity and will follow the few rules set up by the district.

The setting of "Wild Acres" is a lovely, natural one, in a valley not far from the Genesee River. Hills rise, one beyond the other, and the visitor approaching the sanctuary cabin is greeted by chickadees that fly to meet him, and will come to hand if the visitor remembered to bring sunflower seeds! While the setting is a natural one, one will find along the way many plants that have been added to increase the wildlife food supply, including filberts, hazelnuts, high-bush cranberries and Tartarian honeysuckle.

Mr. Davie has taken outstanding colored pictures of birds. These he shows to many groups of adults and children during the year, thus creating real incentive to come, see and feed the birds. Every weekend finds many visitors, including groups from church societies, garden clubs and other groups and individuals. Most important is the work with children — Boy Scouts, Girl Scouts, Sunday School classes, or groups of small guests who thus receive first-hand knowledge of outdoor life. A child who holds a chickadee in his hand for the first time will long remember the thrill.

"I have a small plot of land of two acres on which 2000 red pines have been planted," writes Dr. Robert Common, a sanctuary enthusiast of Andover, New York. "My other plot of sixteen acres was set up as a bird sanctuary. On this are planted, through the help of the Allegany County Soil Conservation District, 14,000 trees, mostly evergreen, but also including mountain ash, arrowwood, honey locust and black walnut. Shrubs for wildlife were also set out. The only change I have made this year is to set out 2000 additional red pines, and I also have a farm pond. It has been stocked with blue-gills and large-mouth bass. The sixteen acres is entirely reforested now, and I am looking for about fifty acres of waste land to continue this program, which I enjoy very much."

A fine example of what can be done with a youth group is described by Mr. William Groesbeck of Hornell, New York, who writes: "Upon our Camp Fire Girl Council property we have a mature bog, a woodland, and old pasture land, 130 acres in all. Our interest lies in renewing the natural beauty of the woodland, preserving the bog, and, by constant and gradual planting,



Even in winter the Davie sanctuary is a place of beauty where wild winter visitors are cared for.

to cover most of the property. We would like to do specimen planting of trees formerly present in our western New York area, such as cucumber, tulip, coffee bean tree, etc.

"The woodland is a hemlock-beech-maple climax, which we will retain for its beauty; the district forester is helping by marking some trees for removal, which will open up the forest floor for the return of wild flowers. Larch and seedling pines are growing, and with the larch a number of red oak saplings have appeared. This spring we planted 5000 Norway spruces and 5000 Scotch pines, and have the promise of shrubs for wildlife.

"The North Hornell Cub Pack of Boy Scouts has made six bluebird houses for the camp. These will be placed near the younger girls' cabins where the bluebirds live."

Inspiration, humor and a keen sense for happy living is found in a report from Miss Cora Puckett, also of Hornell, New York, who writes: "The natural place for reforestation is wild land, the wilder

the better. That is one of the most interesting and delightful phases. I have 333 acres, bought at different times, and I have planted on this basis — red pine for lumber, and, in between, some kind of tree to be used for Christmas trees. There is a total of 102,000 trees, with an addition of 18,000 this year. My first crop of Christmas trees came this year — Scotch pines six years from the planting. These trees are meant to be thinned, thus the plantation is always fifty percent permanent reforestation.

"Thrills in such an undertaking are many. One comes every time I lift my eyes to the hills where my trees grow. Once I found a tiny fawn under a bush, too young to make any effort to escape; too young even to give off an odor. This is Nature's way of protecting it from its enemies. In one sunny spot among the pines arbutus grows in great masses. We make an annual pilgrimage to them, for there is no thrill like stretching full length on the brown, crackling grass of a sunny slope in April, and burying your nose in a clump of trailing arbutus!

"The first big thrill came when I found myself standing, like Paul Bunyan, with a thousand pine trees in my hand."

Small sanctuaries are fun. Why not get a piece of waste land, contact your Soil Conservation Service district manager, and enjoy doing your conservation bit.



Listen for a Crying Loon

By VIRGINIA S. EIFERT

To enable him to travel comfortably and safely on the five-hundred-mile trip to the cabin in the north, Larry rode on a table-bed that fit securely in the back of the car. On this he could see everything that was going on, could look at his books, or sleep if he chose. In this way vacation plans did not have to be abandoned because Larry's leg was in a cast.

THE morning loon went crying over the cabin. In the brown cabin the little boy with the broken leg lay in his makeshift camp bed and, with wide, delighted eyes that mirrored the fascination of the wilderness, whispered: "Bird!" And we knew, then, that bringing a two-year-old child in a body cast to this remote spot in the north woods was not a mistake, but one of the finest experiences we had known.

There were four of us — my husband, a high school science teacher who combined a vacation with insect and plant collecting; Dick, one of his most promising pupils from school; Larry, the eager little boy who had known the woods and waters since babyhood; and I, the cook, birder, and note-keeper.

We already had reserved this remote hunting cabin in the wilderness of northern Wisconsin when, early in June, Larry broke his leg. It was necessary to put him in a cast that immobilized him from waist to toes. Then, as the first desperate days passed, we discovered that a two-year-old adapts himself quickly to a new situation, and perhaps a vacation might still be possible. When he found that he could neither sit nor stand, he made the most of lying prone, propped on his elbows, to play with blocks and trains and books. But, since he could not bend, he could not sit in a car. Therefore, since the doctors agreed that if there were no complications we could take him north a week later than our scheduled time, we needed a way to get him there safely.

The cabin faced south across an open, sunny cranberry bog. There was a high pine ridge to the west; dense, cut-over birch, aspen and balsam woods behind. A tremendous wilderness that the family called the Big Woods, stretched endlessly eastward.

comfortably, and happily. This required some planning.

Consequently, my husband contrived a table-bed, much like a bathinette, which fit securely in the back of the car. The bed had four legs of varying lengths to fit the back seat and the floor, and was covered with a bright canvas top with enough sag to prevent the child from rolling off. The bed was comfortable, brought him to our level of vision, and let him see everything that was passing. When he was tired, he could roll over and go to sleep.

Because we knew that a broken leg in the party would modify our hiking and exploring plans, we invited fourteen-year old Dick to come along and help entertain Larry. Dick, with his kindred interests, at once became a member of our family.

We left at six in the evening on the five-hundred-mile trip due north, and drove all night, except for three hours when we rested in a rural school yard. Larry went to sleep at dusk and slept until dawn. Then, to



There were few entrances to the Big Woods. A favorite was the devious little deer trail near the cabin. This led deeply into the forest and finally crossed one of the old logging roads, which brought the wanderer back to the cabin in a round-about manner

eliminate the complications of going into a restaurant, we breakfasted beside a lake, and reached our destination at noon. There under rain-wet pines stood a brown cabin. And the noontime concert of hermit thrushes put sunshine in the air and an indefinable peace in our souls.

The cabin faced south across an open, sunny cranberry bog. There was a high pine ridge to the west, dense, cut-over birch, aspen, and balsam woods behind, and a tremendous wilderness, which we called the Big Woods, that stretched endlessly eastward to merge with the western edge of Nicolet National Forest. The cabin was comfortably but simply equipped for our purposes. There even was the luxury of a pitcher-pump in the sink, and there was the added touch of dignity lent by an old deer head on the wall. The deer head became our pet at once.

Life revolved around sleeping, eating, and exploring. We usually heard the morning loon going over in the crystalline, cold morning, and, as we reached for another blanket, we heard the insolent racket of the chickarees rolling pine cones down the roof, and the chipmunks chewing popcorn on the doorstep. Larry in his bed — it was like a large slat packing case set on two benches, the handiwork of our host, Sidney Fell — was first to waken. He had his breakfast as he lay on his tummy on the couch. His food was placed on a nearby chair so that he could feed himself; or, when he lay on two suitcases piled on the benches, he came nicely to the level of the table and could eat with us.

On damp days he played on the couch or on the floor,



with Dick close by to draw trains on order. On fine days a blanket in the sunny pine clearing outside the cabin door was a splendid place to play. There the chipmunks came out of the protection of the wood pile, and, with their tails all in a nervous twitch, came to pick up bits of bread, cookies, and remains of our last night's popcorn feast placed for them on a nearby birch log. The chipmunks braved the nearness of the delighted child to come and stuff their cheeks, while he watched in amazement at their capacity. The chickarees came on the roof and stared down at him,

and, perhaps because they knew he was just a baby, they softened some of their churring and cussing. A wonderful, gleaming black squirrel, a phase of the gray, sunned himself along a branch of the tall pine, from the lowest branch of which we had suspended a hunk of fat bacon a few inches from the ground. We smoothed the sand around it every night to serve as an album of tracks. Sometimes at night we heard the porcupines mumbling and fussing over the bait, and a skunk came and sniffed, but usually the tracks



Sometimes Larry was pushed laboriously in a creaking baby carriage along a deer trail that led into the Big Woods, as far as it was possible to go until blow-downs barred the way for wheels.

were too blurred to be good records. But Larry was excited by the bait hanging there and spoke learnedly of "porkypines." At the time, none of us realized we had hung out an excellent bait for bears. For there were bears in our woods, although we never saw them — only their tracks — and none approached the clearing in daylight.

But the deer did. Their trails were everywhere, and several deer trails passed our cabin, headed down into the bog, and crossed to the "islands" out in the muskeg. We always expected to look up from breakfast and see a noble head charging past, but we never did. We saw the deer, instead, on the logging roads at sunset, and one day the boys startled a fawn among the bracken. Deer were an intimate part of our existence.

Although it was summer at home in Illinois, it was late spring in the north. The trees had just come fully into leaf. The white pines still had candles of pale needles that were half sheathed and tender; the swamp spruces looked as blue-white as Colorado blues, the balsams had fringed tassels of palest green, and the tamaracks were soft and feathery with their rose-bud cones still purple-pink and soft. In the woods and bogs the flowers of late spring were at their peak; it was the shining moment before summer when spring still stood supreme.

It was all about us. It gleamed with a special sort of patina across the acres of cranberry bog that lay below the jumping-off place at the rim of pines. Here was a barrier of Labrador tea bushes full of fluffy white blossoms; here the wild irises bloomed, and beyond lay the muskeg. It was composed of thousands of knee-high, spongy hummocks of sphagnum moss that had, over a long period of time, filled a round lake. The muskeg was still very wet, but it was solid enough for a safe, if damp, footing. Part of the bog, however, still was soggy enough for the pitcher plants to thrive. They were at the peak of their splendid maroon and scarlet blossoming, and singly, in small groups, in



The author and Larry, too much of a load to carry on long hikes.



Bunchberry blossomed white in beds that were a mosaic of geometric leaves and flowers.

crowds, the glossy, waxen flowers bent from the tips of the long stiff stems rising above the pitcher leaves. Embedded in the sphagnum around them were sundews, not yet in bloom. Calopogon orchids in bright lavender-pink grew regally in the quaking areas of sphagnum; the rose pogonias were coming into bloom; and *Arethusa*, standing like a spirit of the bog, grew in a secluded spot with a background of Labrador tea and young tamaracks. Cranberry vines, thready and tenuous, trailed thousands of tiny pink blossoms, accented with dark red, over all the sphagnum hummocks from one end of the bog to the other. The muskeg as it lay beyond our doorstep was an open vista across which flew great blue herons commuting between lakes, the daily loons, the ospreys, the black terns, the endless passage of sun and clouds and night and day.

Usually we took turns going out exploring, picture-taking, or collecting. Larry in his cast was too heavy to tote very far, so on lengthy trips into rough country one of us stayed behind while the other two went out. Occasionally we all went together, a pleasure made possible because we had brought along the old baby carriage and Larry could ride in it.

Sometimes after breakfast, when the day's adventures still lay enchantingly before us in the sparkling, cool morning, we unfolded the baby carriage, filled it with pillows, and plumped Larry on top. Along the sandy logging roads we followed the deer tracks, big and little, pricked in the damp sand, and eagerly he watched them until they disappeared in a grand leap into the roadside thickets where the juncos nested. Sometimes we laboriously pushed the creaking carriage along a certain deer trail

that led into the Big Woods, as far as we could go until blow-downs barred the way for wheels, and we had to retrace our steps. And he always came home with trophies carefully cherished in small fists — a green pebble left by the glacier, a blue-jay's feather, a pine cone gnawed by a chickaree, a tiny stalk of twin-flower

with two delicate blossoms, which he insisted on putting into a little glass as soon as we reached the cabin. We all had our trophies — the science teacher with his newest insects and plants, Dick with his curious pieces of gnarled and weathered hemlock knots, I with some bracken tips or mushrooms for lunch, and the memory of many birds.

Always the Big Woods beckoned. These were the trees that Sidney Fell, a former high school principal, over a period of years had bought to save from ruthless logging. Now after a short time of protection, young trees were everywhere to replace the lost generations that had perished under the axe or by fire. The black marks of old fires were upon the biggest trees, and there were ancient stubs and shells of huge patriarchs that were part of the primeval wilderness, blackened yet unyielding remains to show how trees grew long ago.

There were few entrances to the Big Woods. Our favorite was the devious little deer trail near the cabin. Always, as we came here, either alone, or carrying or wheeling the eager child, we felt the presence of unseen creatures. There were the logs torn open by bears; the footprints of skunks; once, in soft sand, the blobby marks of a bobcat whose yowling one night had resounded in the chilly darkness. The death-watch beetles, buried in dead wood, endlessly ticked in hidden places. A banded purple butterfly flitted over the ferns. The chickarees raged like tinny alarm clocks, the chipmunks eternally chattered, and often we startled a slumbering deer from a balsam thicket. But we seldom or never saw the majority of the forest's inhabitants, although we knew their eyes were upon us.

This was pileated woodpecker country. Their massive, rectangular chiselings were everywhere in the dead trees and in many live ones, and occasionally one of the tremendous birds, part of the true wilderness atmosphere, with a great clapping of wings flew farther into the forest. The redbreasted nuthatch, gabbling baby talk, explored the hemlocks; juncos flitted across the path; purple finches sang their clear northern carolings; and cedar waxwings caught insects to feed their young in a big balsam up the slope.

Warblers were all about; this was their home country. At least fourteen kinds nested in the woods, and the males were still at the peak of song. The Canadas sang in the balsams along the logging road; there were black-throated greens everywhere in the hemlocks, a parula zizzing in a yellow birch, a black-throated blue buzzing in the cedar bog, black and whites exploring the cabin pines, a Nashville here, a golden-winged there, a magnolia in a red maple, an ovenbird singing an ecstatic song much like that of the indigo bunting. Here were tropical morsels in their nesting grounds and it was a peculiar privilege to see them there.

In the Big Woods the delicate trailing vines of twin-

flowers, holding pairs of pink bells above neat dark green leaves, mingled with the *Lycopodium* and knight's plume moss and wood ferns, with lush lichens and with curls of fallen birch bark. Bunchberry blossomed white in beds that were a mosaic of geometric leaves and flowers; columbine and spikenard were in bloom; so was Canada mayflower, like bits of foam along the path, and there were the tight buds of pyrola and pipsissewa about to bloom. In the sunny logging roads the orange hawkweed was bright.

Days were never long enough fully to understand the Big Woods, and the trails were too faint to dare follow at night. But we had other plans for evening. We had an early supper and left the dishes until later because the deer came out of hiding shortly before sundown, and then we had our nightly deer hunts. By the time we returned, sunset and dusk around the cabin and the bog were full of music and wings and the high-tailed leaping of the deer. As the yellow light streamed through the pines and made them all the blacker in silhouette, and all the greener against the east, and when the birches gleamed with a glint of gold on their silvery kidskin trunks, the nighthawks began their hunting. Over the ridge and the forest and out over the muskeg they flew in jagged flight, squawking, then dived with a rush of air through stiff feathers to make an eerie booming. The nighthawks sounded like aerial bullfrogs in the great quiet of the evening, and set alive the atmosphere. Among the birches, and among the tangles of bracken, the white-throated sparrows piped, and with them the hermit thrushes sang in carefully spaced chromatics, until well past the time of darkness.

In the dusk the snowshoe hares came loping into the clearing to stare wide-eyed at the cabin. Perhaps they never had seen people before. Night herons went over; tree frogs churred and spring peepers were at it again in the distance. A barred owl called; loons sometimes flew back and forth over the muskeg, crying. And there were other sounds, unexplained sounds. The two men went bravely out on nightly prowls along the logging trails and often came back full of excitement over what they had heard and what they had sensed near them.

On our last night, as a farewell to the north and its wild things, we held a ceremony around the amiable old deer head on the cabin wall. With the child watching in awe, we fastened a candle on one of his blocks and set it, lighted, on the deer's once noble crown. And in the single eerie light, and in the sudden silence, we felt the eyes of the wilderness crowding around to see this strange thing that was happening to one of them.

Next day, in the cool gray morning, we headed south. We had seen the story of June in the north woods and always, now, when we think of the north, we shall listen for a crying loon, and remember.





AGRIMONY

COLLIE dogs and shepherds, Scotties and cocker spaniels, setters and Airedales! Farm dogs, work dogs, hunting dogs, pets! All these, along with many of their lowly mongrel cousins, have one thing in common, long hair. All may return from a romp in the country with their hair matted around the fruits of wild plants. They will spend hours chewing the fruits out of their coats unless some human friend removes them.

But what are these fruits that the dogs bring back? What will they develop into if they are allowed to remain on the fertile soil of the garden or the flower bed?

Careful investigation of these fruits will tell several stories — the story of seed dissemination, the story of the plant from which it came, the story of the probable locale of the dog's adventures.

If the dog has been travelling through waste fields, corn fields, or low land along a river he is apt to come home with several cockleburrs, *Xanthium*, attached to himself.

Each cocklebur contains two fruits and is the product of two inconspicuous flowers. Each of the fruits is capable of producing one new cocklebur plant. One of them will be ready to germinate the following spring. The other must remain in its spiny covering for a year before it will be ready to grow, and may remain several years. Studies have revealed that one side of the cocklebur has a weak spot through which gases and moisture enter to start germination. The other side of the cocklebur lacks this and so protects the fruit for a year or more.

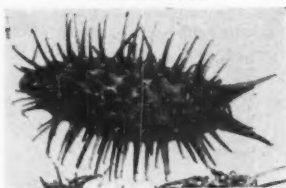
Cockleburs grow only from these seed-like fruits, but as long as there is one patch of cockleburs in a community other patches will continue to spring up. Not only dogs, but other animals, as well as man, distribute them over the countryside.

If the dog comes home with burdocks, *Arctium*, matted in his hair, the chances are that he has not been gamboling through cultivated fields, but, rather, that he has been investigating the waste places around some barn or some other uncultivated area. Burdocks generally cannot

What the Dog Brought

By HELEN ROSS

COCKLEBUR



BURDOCK

withstand cultivation, so they are no problem in fields. They thrive in the rich waste lands that sometimes exist around farm buildings.

Each head, or bur, which is so difficult to remove from the animal's hair, was at one time composed of many small purple and white flowers. Now it contains many fruits. Each fruit is

the product of a single flower. If given a chance, each will germinate into a new burdock plant the following spring. These new plants will be ready to produce a new crop of burs at the end of two years' growth.

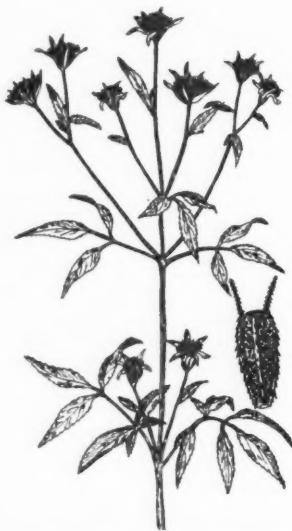
Another type of fruit that is frequently picked up is the *Bidens* group, known as beggar-ticks, Spanish needles, and pitch-forks. Beggar ticks are two-pronged. Spanish needles are long, slender, with four prongs with recurved hooks. Pitchforks are short and broad with four prongs. All grow in heads with the prongs pointing upward. The pitchforks are the fruit of the smaller bur marigold, *Bidens cernua*, and are picked up in swampy land.

Also from swamps come sandburs, *Cenchrus pauciflorus*. Sandburs are spiny structures, which enclose several heads of grass flowers. The burs are round, about one-quarter-inch in diameter, and are well supplied with sharp hooks.

Sometimes the dog arrives home with a spiny plant matted in his fur. This plant, with its small attached fruits, is one of the bedstraws, *Galium*, or cleavers. The stem of the plant is four-angled. It has hooked bristles along each angle. The fruits are sometimes equally spiny, sometimes smooth, varying with different species.

One of the most difficult fruits to remove, and the easiest to acquire, is the stickseed, *Lappula*. Each of the blue flowers of the stickseed produces four nutlets, armed with a double row of barbed prickles. The nutlets break off the plant easily when they are brushed against, but they are difficult to remove once they are attached to something. Stickseeds grow in dry places, in pastures and waste areas.

Closely related to the stickseed is the (Continued on page 393)



ONE OF THE BEGGAR TICKS

Catching Fishes with the Hand

By DR. E. W. GUDGER

American Museum of Natural History



"Tickling Trout," an illustration of fishing by hand. From Richard Jefferies' *The Gamekeeper at Home*, published in 1890.

SOME time ago a letter came to the American Museum of Natural History asking the settling of a controversy as to whether it is possible, by putting the hand gently into the water on the shady side of a brook, to have a fish "cuddle" in it and thus be easily caught. My interest in unusual fishing methods being well known, the query was referred to me. By good fortune I had first-hand knowledge of this practice when a boy. Hence I was able to answer the correspondent's query in the affirmative.

Incited by this request for information, the literature has been searched, and three published accounts of this fishing — with the human hand alone — in each of the two Americas have been found.

So far as I have found, this fishing method does not seem to have been practiced by the Indians of North America north of the Rio Grande, or by the Toltecs and Aztecs south of that river. However, it was and is practiced in the United States by the descendants of English-speaking settlers.

In the southern Appalachian Mountains, my home town, Waynesville, is situated on the high plateau of western North Carolina. Seventy years ago all the streams in that whole section abounded in fishes, brook trout especially. About a mile from my home, my playmate, John Norwood, lived almost on the bank of a brook filled with fishes. I was there often, and in that brook he and I, literally "barefoot boys," used to wade and "grabble" (as we termed it) for fishes. These took refuge under stones, roots, stumps, submerged logs and overhanging banks. Here we found the fishes and brought them out with our hands. I, from infrequent practice, was not very successful, but John, who was in the brook almost every day, was very skillful. And little did he know that he was doing what his English forebears had probably done hundreds of years before. Whether he "cuddled" or "tickled" the fishes I cannot recall. Nor can I remember whether other boys in our section caught fishes in this fashion, but it seems probable.

In speaking casually of this fishing to two friends in

the Museum, each said — "Yes, I have caught fish with my hands," and each has recorded his experience for me.

Mr. George Goodwin is English born and he practiced "tickling trout" in his boyhood homeland. Some 25 years ago he and a friend were speaking of the gullible public, which swallows as facts almost anything that is found on the printed page. His friend mentioned as a case in point — "that ridiculous story about tickling trout."

"To me this was no story of the fickle imagination," says Goodwin, "and to prove my point the two of us were soon on our way to a stream in the Orange Hills, New Jersey. At the very first stream we found an ideal spot where the swift-running water, draining from a deep pool, cut under the bank. Lying prone on the ground with my sleeve rolled up I reached down into the water; the back of my hand was on the gravel bottom and the tips of my fingers were turned up. I felt cautiously under the bank and, moving gradually upstream so as to approach a trout from the rear if there was one, presently my finger tips ever so faintly touched the smooth underside of something that, though seemingly stationary, actually moved a fraction forward. Luck was with me, I had a trout almost within my grasp. Slowly and lightly my fingers caressed its smooth belly, working gradually forward. In five minutes my fingers had reached its gills, now my forefinger and thumb slowly crept up each side while my little finger continued to lightly massage the central belly line. Then, with a steady firm pressure, my thumb and forefinger locked into the gills and a ten-inch trout was lifted into full view of my astonished and now convinced friend."

Dr. H. E. Anthony has harked back to some boyhood experiences of fishing with the hand in a somewhat different way.

"No one taught me," says this distinguished mammalogist, "but as a boy nine years of age, I caught trout by hand in the Sierra Nevada of California. A clear-water brook contained a fair number of trout,

which frequented retreats under boulders and shelving rocks. I knew the location of the best of these and not infrequently was able to catch fair-sized fish by bringing my hand across the opening of such a nook. When a fish was thus located it would attempt to push past the hand to open water. By careful manipulation of my fingers I could get a grip back of the gills and draw out the struggling fish. An attempt to pull out the trout with a grip on the body usually permitted the fish to slip through my fingers. It was necessary to slip the fingers to the gill-grip and this was best done by gentle movements rather than a rough seizure that made the fish desperate."

Professor H. H. Lane of the University of Kansas states in a personal communication: "My experiences in catching fish by hand are very few and occurred mostly when I was a boy in Indiana. In common with other boys, I would occasionally lie down on a flat rock or log and reach underneath it for sucker or shiner, which only occasionally was so penned in that it could not escape."

From remarks made by various individuals to whom I have spoken of this fishing, I am satisfied that it is a practice well-known and widespread among boys in the United States and in Canada.

Turning to another part of North America, we find two interesting accounts of hand-fishing by the aborigines.

Lionel Wafer went to Jamaica about 1675, and, in 1679, joined the buccaneers. In 1680 he crossed to the Isthmus of Panama with Captain Dampier and presently was left there among the Indians, with whom he lived until 1684. In 1699 he published the first good description of the Isthmus in English. Wafer was much interested in the natural history of the region and described many of the striking things new to him. His account of the fishes is good reading, and his description of a method of fishing in the rivers is especially interesting. He notes that when the Indians go along the banks of a river they are always looking for fishes and then he states that "... in the Hill-Country where the Streams are clear ... they go along the Banks up the River looking narrowly into the Water to view the Fish. When they spy any to their Mind, they leap into the Water, and wade or swim up and down after them; and if the Fish, through Fright, betake themselves into the holes in the Banks, for Shelter, as they frequently do, the Indians feel them out with their Hands, and take them thence, as we do Chubs or Craw-fish in our [English] Rivers. By Night they bring with them Torches of Light-wood, and with these they spy out the Fish and so jump in, and pursue them into their Holes."

Dr. C. M. Breder, Jr., head of the Department of Fishes in the American Museum, some 225 years after Wafer, spent some months collecting and studying the fishes of the Rio Chucunaque drainage on the Pacific side of the Isthmus. In the section of his paper (1927) dealing with the fishing methods observed, he has an interesting account of those practiced by the Chocoi

Indians in certain side streams of the lower main river. Of the method of interest to us, he writes that even without spears ... "they are still able to catch fish with comparative ease by resorting to the simple expedient of diving overboard and catching them with their hands. The loricates [mailed catfishes] are usually the target for such activity, and the divers invariably bring the fish up between their teeth, placing them there, head first, to enable them to have more freedom of hand-movement. Occasionally they even capture a cichlid in this manner. Just how they are able to do it I am at a loss to say, for all that could ever be seen was the diving overboard, followed by a great flurry in the water and an emergence the next moment with the fish."

Here it is seen that, in the same region, Breder, two and a quarter centuries later, corroborated Wafer's observations. Wafer does not name the river of this fishing, but the account is in the chapter in which fishes of the north coast are described. Presumably he saw this fishing in the north-flowing rivers, whereas Breder saw it in a Pacific-drainage stream.

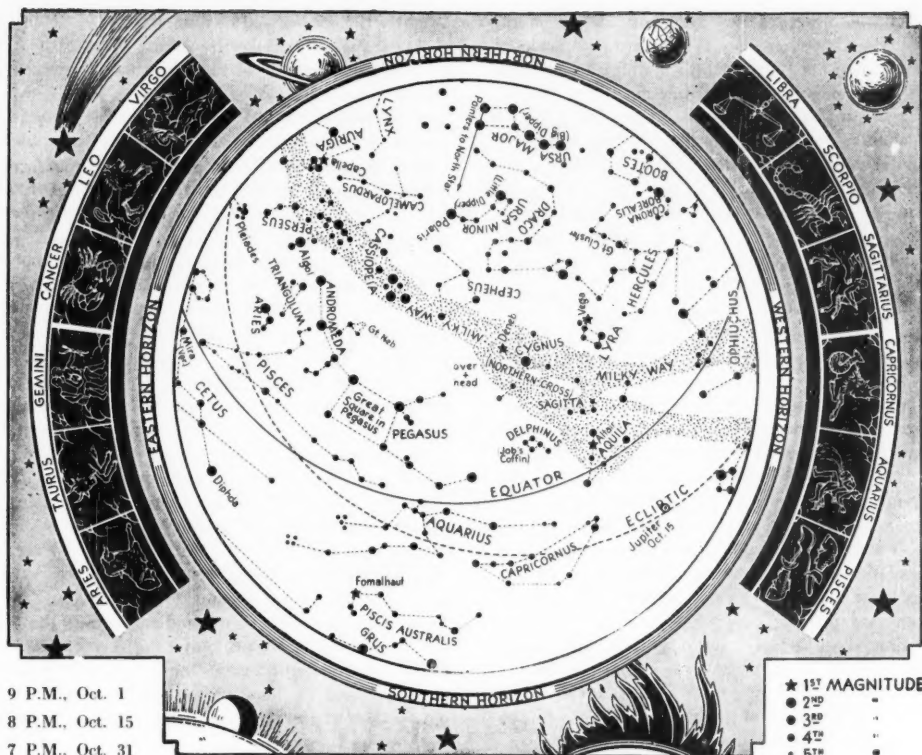
In the book *The Lummi Indians of Northwest Washington* by B. J. Stern (1940), the statement is made that these Indians catch flounders by wading in the water, and that they ... "hold the fish by stepping on them until they can pick them up and throw them into the canoes." This account is interesting in itself, and also because it ties up with an account of feeling for fishes with the feet as recorded from China by Robert Fortune in 1847.

When one thinks of the continent of South America with its great river systems, one wonders if this fishing is not practiced there by the riverines. But only three accounts of hand-fishing have come to light, and two of these are from the same region.

In the Gran Chaco, the ill-defined region wherein Argentina, Bolivia and Paraguay meet, the Indians, according to Edward Krause, practice hand-fishing and have adopted an interesting device to enable them to secure their slippery prey. "The Lengua Indians," he says, "to prevent the escape of the fish when fishing with the hand, wear around the hand a band set with small animal vertebrae. The projections of the vertebrae hold the slippery fish easily." This is indeed a clever and efficient device, since it is impossible to hold the fish with the bare hand unless the grip is in the gill-region.

Twenty-five years later a different hand-fishing in this region was described by L. C. Beadle, who writes as follows:

"The simplest and least skillful method employed on these occasions [the oncoming of droughts and the concentration of water and fishes in pools] is known in the Lengua language as 'Pakningwukme' or 'feeling for the fish.' A party of men strip themselves and surround a clump of rushes, squat down and merely feel among the stems with their hands for fish hiding there. ... When each fish is caught it is killed in a somewhat barbarous fashion. The head (Continued on page 394)



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The Moon Again Hides Its Face

By ISABEL M. LEWIS

FOR the second time this year there will be a total eclipse of the moon, visible on the evening of October 6 in nearly the same part of the earth's surface as was the case with the total lunar eclipse of April 13. The area over which the eclipse will be visible will include all of North America — except the extreme western and northwestern parts —, South America, the Atlantic Ocean, Arctic and Antarctic regions, Europe and Africa and western Asia. The region of visibility of the eclipse, compared to that of the April eclipse, will be shifted only slightly to the east and south. The times of the corresponding phases will occur as a result earlier in the evening by more than an hour. In Eastern Standard Time the moon will enter the shadow of the earth on October 6 at 8:05 P.M., and the partial phase of the eclipse will then begin. The moon will be completely within the earth's shadow at 9:20 P.M. This will be the time of beginning of the

total eclipse, which will last for nearly one hour and fourteen minutes, ending at 10:33 P.M., Eastern Standard Time. The moon will leave the earth's shadow and the partial phase of the eclipse will end at 11:48 P.M.

The greatest distance to which the moon will enter the shadow of the earth is a measure of the magnitude of the eclipse, and it occurs near the middle of the total phase of the eclipse. It is measured in parts of the diameter of the moon. The magnitude of the coming eclipse, for example, will be 1.23, and, as the diameter of the moon is 2160 miles, this is another way of saying that the moon enters the earth's shadow at a distance of about 2650 miles. In the April eclipse the moon penetrated more than 400 miles farther into the shadow. The width of the earth's shadow at the point where the moon enters it will be about 5700 miles. The distance of the moon from the earth at

the middle of the eclipse will be about 255,006 miles, and the cone-shaped shadow of the earth has its apex at a distance of about 867,600 miles from the earth, or about 612,600 miles beyond the moon.

The greatest known magnitude of any total eclipse of the moon is 1.90. Even in that case the moon did not pass centrally through the shadow. It may enter the shadow at any angle, and at times dips into it completely for only a few minutes. The eclipse with this greatest magnitude was one that occurred in April, 1092, and the total phase of that eclipse had the greatest duration possible for a total eclipse of the moon — one hour and forty-four minutes. Many have been nearly as great.

There are more eclipses of the sun than there are of the moon, in the proportion of about 8 to 5. There must be at least two eclipses of the sun every year, but there may be none of the moon. Yet many people have never seen a total eclipse of the sun, although they have probably seen a number of total eclipses of the moon. In the years 1929-1949 there are 32 total solar or annular eclipses, and only 15 total lunar eclipses, listed. Yet during this same period no total or annular eclipse of the sun was visible at Washington, D. C., nor has there been at any time in its history. In the same interval of time nine total lunar eclipses have been visible, except when clouds defeated the observers, which happened last April. The reason why many more total lunar than total solar eclipses are observed in any one locality is that a total lunar eclipse can be seen from wherever the moon is above the horizon, during the period of the eclipse, i.e. over half of the earth's surface, while the path of a total eclipse of the sun never exceeds about 167 miles in width and may be less, even less than a mile in rare instances, although its length may be more than 5000 miles. When one considers that much of this path within which a total solar eclipse is visible often passes over many miles of ocean wastes or uninhabited regions, it is not strange that very few recall ever having seen a total solar eclipse.

As many know from observation, the moon does not entirely disappear from view when completely within the shadow of the earth. It shines, at times quite brightly, with a strange coppery light. How bright it will appear depends upon how much light gets through the earth's atmosphere in the sunrise and sunset circle that surrounds the dark globe of the earth as seen from the moon during the total phase. Many who observed the total phase of the eclipse of last April were impressed with the fact that it was an exceptionally dark eclipse. The moon, although visible at mid-totality, was only faintly luminous. This was an indication that there was dense cloudiness over a large part of the earth's surface within the sunrise and sunset circle. This is the region from which the sunlight, passing through the atmosphere, is bent into the cone of shadow, and casts faint illumination over the moon's surface. The clearer the skies in this region the more

brightly the surface will be illuminated.

At the time of a total eclipse of the moon the heavens, as seen from the side of the moon turned toward the earth, shine with a splendor unknown on this atmosphere-blanketed planet. Since there is no atmosphere on the moon the solar corona, as well as the stars, are visible at all times. Our planet, appearing sixteen times greater in surface area than the moon does to us, totally eclipses the sun during the total phase of the lunar eclipse for an observer on the moon. The dark, rotating surface of the earth as seen from the moon is surrounded by the more or less brightly illuminated ring of atmosphere, depending upon how transparent it is to the sun's rays at the time. In addition, the solar corona will be seen extending to a much greater distance than it can be traced during a total solar eclipse by a terrestrial observer. The greater size of the earth disk, however, will conceal for the lunar observer the great beauty of the pearly radiance of all the delicate tracery and complex form of the inner corona that can be seen from the earth when the moon's disk covers the surface of the sun during a total solar eclipse.

The times that have been given for the various phases of the coming lunar eclipse are in Eastern Standard Time. The corresponding times in the other time zones in the United States will be found in the usual way by subtracting one hour to obtain the Central Standard Time of the phases, two hours to obtain Mountain Time, and three hours to obtain Pacific Time.

At the time of the beginning of the partial phase of the eclipse the moon will be directly overhead in longitude approximately 20 degrees west of Greenwich, and latitude about $41\frac{1}{2}$ degrees north. At the end of the partial phase, when the moon is again clear of the earth's shadow, the moon will be in the zenith of the observer in longitude 74 degrees west of Greenwich, and latitude $51\frac{1}{2}$ degrees north. This change in position of the moon during the interval of the eclipse, from the time it first enters the earth's shadow to the time when it leaves it, is due not only to the advance of the moon in its orbit during the eclipse but also to the effect of the rotation of the earth on its axis. If one locates on a globe the point where the moon is overhead at the beginning of the partial phase, given above, then the circle on the earth's surface ninety degrees distant at all points from the point overhead gives the position of the regions where the sun is rising and setting at the time. Also it indicates where the moon is rising or setting at the same time opposite to the sun. This is the region we have referred to, from which the illumination comes for the lunar surface during total eclipse. Its position will change during the eclipse. How and where this change occurs will be seen by finding on the globe the position of the moon in the zenith for both beginning and end of the partial eclipse, given above, and finding the corresponding circle of sunrise and sunset, (Continued on page 390)

Camera Trails

By EDNA HOFFMAN EVANS

USUALLY the mail man brings interesting and pleasant letters but, occasionally, he arrives with one that makes me a little hot under the collar. One such collar-warmer arrived not long ago. It was a request for information concerning equipment to be used in taking Nature pictures by remote control.

That part of it was perfectly all right. But the letter went on to state that the camera dealer in the writer's particular town had said that *all* Nature photographers employed some kind of electrical device, even though they maintained (in print) that they used nothing but the string-on-trigger method. That is what made me hot under the collar. But, after counting to ten and swallowing three times in order to settle my temper, I decided to do another "Camera Trails" section on this business of photography by remote control.

Personally, I prefer the string method. In the first place it is the only device that will work with my Graflex. Secondly, I have enough poundage to carry around — camera, extra lens, filters, exposure meter, and tripod — and I do not feel like adding more in the form of wires, batteries and the like.

However, there are cameras that lend themselves more readily to such devices, and there is equipment less heavy and cumbersome than mine. It is true, also, that numerous Nature photographers do use such devices — either home-made or store-bought. Further, it is also true that some cameras have triggers placed in such a way that it is practically impossible to work them from a distance by means of a string.

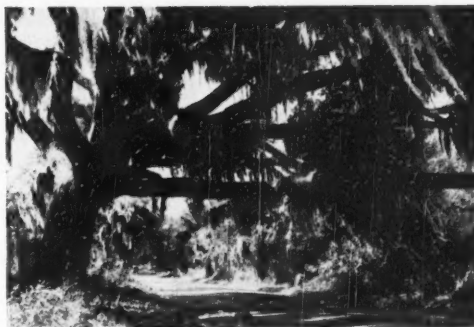
Probably the most popular kind of remote control device makes use of the solenoid — a type of electro-magnet that can be found explained in any physics text book. The physics books, however, say nothing about the solenoid's application to photography. They usually say something like this, and I quote from two different texts: "A solenoid is formed of a coil of insulated wire in the form of a cylinder in one or more layers," and "A solenoid is a spiral of wire, the successive turns of which are of the same diameter. Such a coil is obtained by winding the wire spirally upon a cylinder."

Set up for photography, the solenoid takes the form of a small metal gadget, about two inches long, that can be attached to the lens-board of the camera close to the trigger. Some are arranged so the current causes the trigger to move up or down; others press the trigger in, thereby releasing the shutter. There are several different types on the market and the photographer can purchase the one designed to fit his particular camera.

His additional equipment includes batteries and a double coil of wire. Three ordinary flashlight-size batteries are sufficient to use with twenty feet of wire. For longer distances, more batteries must be added — the greater the distance the operator is from his camera, the more electricity he must have to send the impulse over the wire. Of course, the same impulse that trips the shutter will also set off the flash gun, if one is to be used. Many Nature photographers use flash bulbs, even when working outdoors in daylight. This throws better light on the subject, does away with unwanted shadows, and, in the case of color film and proper exposure, gives a better and truer color rendition.

A solenoid is a rather individual thing, and, before buying one, the photographer should consult his camera dealer to make sure he gets one adapted to his particular camera.

What advantage does this electrical gadget have over the string method? Well, it works a great deal faster and, as long as the batteries are strong, is more dependable. After all, one push of a button and the exposure is made. With a string, one must pull in the slack, and, while this is being done, an elusive and wary subject may take fright and fly away. I know; I have had it



There is a quiet satisfaction in taking this old oak's portrait that cannot be equalled by the greatest thrill from the world of sport or celebrities.

happen to me. The string method is not perfect by any means. But there are "bugs" to be found — usually in the form of dead batteries — in solenoids, too. And, regardless of what method of trigger release is used, the photographer still must move up, change film, and reset the camera before taking another picture. Such activity, naturally, will tend to frighten away any wary subjects. The moral is — with solenoid or with string — take every precaution to see that the first "shot" counts. You may not have the opportunity to take a second.

While I was investigating last-minute details on the solenoid, I ran into another interesting new development. It is called a Servo-Flash, and it, too, operates by remote control by means of a photo-electric cell. It consists of a box that contains the "electric eye," topped by a traditional flash attachment and reflector, and that is all — no wires, no buttons, no nothing. You can set it twenty or even more feet from your camera, and, when the camera flash goes off, the Servo-Flash operates also. Owing to the speed of light, there is no time interval between the two flashes; to all intents and purposes they are simultaneous, even though one sets off the other. Such an apparatus can be used to give additional light, either indoors or out, and can be used readily in connection with a solenoid.

Solenoids come in varying prices, depending on the make and the model. The Servo-Flash sells for \$22.75 plus tax.

TABOO SUBJECTS

Now for photography proper. Most photographers are more interested in what to photograph, rather than in what not to photograph. None the less, there are some photographs that are definitely forbidden by law. During the war, of course, cameras were banned from many areas, for obvious security reasons. There are still some areas closed to photographers. Besides these, there are things about which Uncle Sam, or one or more of the States says "positively no pictures" in peaceful times as well as during wars.

Most people know that photographs or photostatic copies should not be made of money, whether bills or coins — and that includes foreign money as well as good old U. S. dollars and cents. But did you know it was also unlawful to photograph checks or drafts for money drawn by or upon authorized officers of the United States, bonds, certificates of deposit, certificates of arrival or of naturalization, citizenship papers, visas or passports? Besides that, on the federal taboo list are obligations of any foreign government, bank or corporation, adjusted compensation certificates of veterans, American radio operators' licenses, and social security cards. Some States also have laws forbidding the photographic copying of drivers' licenses, automobile licenses or titles. Quite a formidable list of legal "don'ts."

Another "don't" I heard not so long ago concerned pictures taken of the midget racers that crack up while giving speed fans a thrill. It seems that midget car drivers don't approve of such



This is the new adapter kit designed for Kodak Tourist cameras. A special back replaces the standard back of the camera, and a set of masks and film-spool adapters fit the camera for making three sizes in addition to the regular $2\frac{1}{4} \times 3\frac{1}{4}$.

pictures taken while the driver (be he injured or dead) is still in his car. They have been known to smash the camera of a photographer who tried. Why? People who should know have explained it in several ways. First is a matter of racetrack superstition that considers such pictures bad luck for all concerned in the sport. Second, it is bad public relations; such pictures would give the public an idea that the sport is too dangerous, thereby either whetting appetites for more blood or frightening squeamish patrons away. In a way both explanations are logical, so take your choice.

Then, too, there are those temperamental celebrities — either famous or infamous — who object to having their pictures taken, and who occasionally smash a photographer's camera. Sometimes I cannot help but feel that such actions are justified, since everyone is entitled to privacy. At other times, the camera-smasher seems to be seeking more lime-light than ever by his destructive tactics.

Fortunately, Nature photographers do not have to worry too much about taboos and such. There are no laws against animal, plant or scenic pictures — unless one exempts the American eagle on some coins and the buffalo on nickels. Sometimes, of course, subjects object to having their pictures taken, and occasionally they may even fight back. But, by and large, Nature photography provides plenty of interest and thrills, without any bad taste that might linger forever after.

AT RANDOM

For teachers interested in visual education, the Educators Progress Service, Randolph, Wisconsin, has announced publication of a new pamphlet, "Improving the Effectiveness of Visual Materials," by Dr. John Guy Fowlkes. The pamphlet, which analyzes methods and applications

of films, slides and slide films, may be obtained without charge from the Service.

The mail has recently brought two interesting photographic supply catalogs — one sent out by Medo, 15 West 47th Street, New York 19, and the other by Weimet Photo Products Co., 514 West 57th Street, New York 19. The former lists, among others, a new Swedish camera, the Hasselblad. It is a single-lens reflex, using 120-sized roll film. Its shutter has speeds up to 1/1600 second, which is mighty fast. The price, however, puts it beyond the reach of most of us for it is listed at approximately \$560.

Eastman has placed on the market an interesting new adapter kit for its Kodak Tourist folding cameras. The kit consists of a special back, which replaces the standard back of the camera, and a set of masks and film-spool adapters that fit the camera for making negatives in three sizes — $2\frac{1}{4} \times 2\frac{1}{4}$, $2\frac{1}{4} \times 1\frac{1}{2}$, and bantam — in addition to the regular $2\frac{1}{4} \times 3\frac{1}{4}$. Such an arrangement makes possible the use of bantam-size color film, or more exposures on the regular size film without reloading. The kit sells for \$14.50 including tax.

THE MOON AGAIN HIDES ITS FACE

(Continued from page 388)

and moonrise and moonset. This will also show why, along the eastern region of visibility of the eclipse, the moon will be setting just before sunrise with a small partial eclipse, and near the western region of visibility of the eclipse, the moon will be rising partially eclipsed. The first region is in western Asia and the western part of the Indian Ocean, the second in the eastern and central parts of the Pacific Ocean. All of the total eclipse will be seen in the region midway between these two extremes in North and South America and the Atlantic Ocean under the most favorable conditions.

There will be a partial eclipse of the sun on October 21 in the southern Pacific and Antarctica. It will be visible to Australia, except the western and northwestern parts and to the islands north and northeast of it as a very small partial eclipse. The eclipse will be quite large in Tasmania and New Zealand, and the greatest eclipse, 96 hundredths of the sun's diameter covered by the moon at maximum eclipse, will occur in longitude 107 degrees east and latitude 62 degrees south.

Among the planets this month Mercury will pass to the morning sky at time of inferior conjunction on October 3. It will be in fine position for observation in the morning sky for nearly two weeks before and after the time of greatest elongation on October 19. It will be quite close to the moon on October 20, and so can be easily located then. It will be as brilliant as a star of the first magnitude. Venus is

now in the southwest, rather poorly placed this month and not far above the horizon at sunset, but improving slowly in position. Mars is in the morning sky, rising an hour or so after midnight. It will pass Regulus about a degree to the north of it on October 24. Jupiter will be found in Sagittarius in the southwestern sky. On October 17 it will be due south at sunset, setting a few hours later. Saturn is in the morning sky in Leo. It rises about an hour after Regulus and a few hours before the sun.

Scientific Integration

Genetics, Paleontology and Evolution, Edited by Glenn L. Jepson, George Gaylord Simpson and Ernst Mayr. Princeton, New Jersey. 1949. Princeton University Press. 474 pages. \$6.00.

In 1943 the Committee on Common Problems of Genetics, Paleontology, and Systematics of the National Research Council was formed. Its function was to attempt "to bring about a meeting of minds in the territory between the fields of genetics and paleontology, of furthering cooperation between students in the two and in other disciplines, and, by pooling knowledge and methods and resources, of outlining promising lines for future research." These goals find expression in the pages of this book, which brings together the thoughts of the leading workers in the fields of genetics and paleontology. It is a collection of papers given at a conference and then revised in the light of comments there made.

Harvesting Timber

Harvesting Timber Crops. By A. E. Wackerman. New York. 1949. McGraw-Hill Book Company. 437 pages. Illustrated. \$5.00.

This is the latest addition to McGraw-Hill's "American Forestry Series." The author is Professor of Forest Utilization of the School of Forestry at Duke University. The text covers all phases of timber harvesting, treating it as an integral part of forestry rather than as a separate procedure.

On the Seashore

Seashore Treasures. By Charles Howard Edmondson. Palo Alto, California. 1949. Pacific Books. 144 pages. Illustrated. \$3.50.

This is a book for the younger scientists interested in the life of the seashore. The setting of the book is the reefs and beaches of the Hawaiian Islands, but its contents are in considerable measure applicable to Pacific seashores generally. Two hundred or so photographs and drawings are excellent aids to identification, and the text is popular and intriguing.

INDIAN NAMES

By W. L. MCATEE

Sometimes we hear the expression, "The Indians called it", ending with an English term. That the name supplied is a translation should be understood. The Indians used little English, but had distinctive languages for every tribe and these were numerous. To illustrate—when whites first came to the Juniata Valley, Pennsylvania, they found representatives of four tribes of Indians there. In all, there were in America, north of Mexico, 58 language families, with vocabularies as distinct as, say, English and Chinese, and as to dialects, there were around 600. So, when I write of a few Indian expressions here, I may be pardoned for giving them in translation, not in their possibly numerous original forms.

Two weeds that were brought from Europe by the early colonists, doubtless unknowingly, were the broad-leaved plantain and the field daisy. Their advent with the pioneers was noted by the Indians who called them, respectively, white-man's foot and white-man's weed. The large, ovate leaves of the plantain give some color to the name, "white-man's foot," but what was really meant was that the plants were not seen except where a white man had trod. This name was recorded for Virginia by John Clayton in 1687. Where trails and camps are made, soil is exposed or turned and an opportunity given for new plants to appear. How do they do it? First, the seeds must be there. And how do they get there? The ways are numerous, but the wind seems the most likely agent for distributing the small light seeds of the plants mentioned, although they are not specially adapted to be wind borne. I say wind borne in view of the early days concerned, when feed for domestic animals (a common vehicle for weed seeds) was little transported; oxen and horses then had to live off the country. Nowadays the most likely source of weeds seen in old woods roads is feed carried in by and for horses.

To get back to the text, the weeds were evidently brought by white man so were named accordingly. Is there any reverse to the picture? Yes, in the Illinois Country (a rather vague region that included parts of Kentucky and Indiana, besides the area now recognized as Illinois), according to John H. Bryant writing in 1845, the people had "a proverbial saying that the blue grass springs up wherever an Indian foot has stepped. Although this may not be literally true, yet it is certain that the blue grass is always found growing where the Indians have encamped, although it might have been only a few days. This kind of grass makes a soft and rich turf, thick with blades, in which respect it is very different from the common coarse grass of the prairies." (In W. T. Coggeshall, *Poets and Poetry of the West*, 1860, p. 196). So it doubtless was styled "Indian grass", a name shared by other plants although for

a variety of reasons.

Another Indian name commemorates a bit of natural history that is interesting and unique. Do you realize that one of the creatures introduced into America by the white man spread and occupied the country more rapidly than he? Well, one did, and that was the honeybee. Tree cavities in which it could have abounded; it could live independently of man, was a good flier, and rapidly extended its range. In the Ohio Valley, the Indians used to say when they saw a swarm of bees in the woods, "Brothers it is time for us to go, for the white people are coming." They called these harbingers of the whites, English flies or white man's flies. Translations again, of course, so may we hope that with some of the tribes the name may have been "bees," for a distinction well to keep in mind is that between flies and bees. Otherwise the heedless might have to learn like the Irishman who pinched a flower of trumpet-creeper so as to trap a bumblebee. He soon cried out, "My! how hot your little feet are."

KILLING AS LOVING CONTRIBUTED

Having read a book dedicated, "To the lovers of nature," the question again arose, "What is a nature-lover?" The greater part of the volume in hand is devoted to description of hunts and their invariably bloody endings. The work glorifies those "who yet retain enough of the old leaven of the wild man, to love to destroy the birds of the air, and the beasts of the field." According to the teachings of this author, the Nature-lover must be an habitual killer.

To the normal mind, killing is not easily accepted as proof of love. Jurors are not favorably impressed when a murderer rants, "I killed her because I loved her," or "I killed him for love. Oh! how I loved him." Neither will the larger jury, composed of all of us, in the long run admit that killing fish simply to test the skill of the fisherman, dislodging animals from trees to be rended by dogs, blasting beasts of all sorts with gunfire, and fire-lighting woodcock "until every one is destroyed," constitute acceptable evidence of a genuine love of Nature. On the contrary, they tend to show that mankind, condoning such cruelties, has not yet really emerged from the savage state.

What of the Wisent

A large part of the July, 1949, issue of the *Journal of the Society for the Preservation of the Fauna of the Empire* is devoted to presentation of information on what is known of the present status of the wisent, or European bison, the possible progenitor of our own North American bison. This animal is apparently no longer to be found in the completely wild state, but specimens in captivity, or virtual captivity, still exist. This discussion is of particular concern to anyone interested in mammals or the preservation of species.

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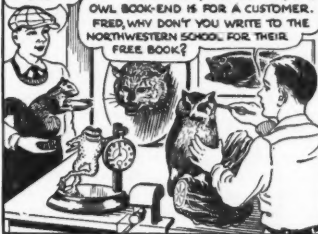
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CAPE ROMAIN

(Continued from page 356)

the turkey food, and that is a management problem, and then the wily raccoon inserts his black paws into the picture by eating the turkey eggs. When the refuge manager contemplates this depredation by warring on the raccoon the animal-lovers protest loudly that the raccoon is a gentle beast and would not harm a single egg. And that is another excellent example of the broad scope of the phrase "wildlife management."

Not content with turkey eggs, the raccoon preys upon another interesting refuge inhabitant, the loggerhead turtle, which comes ashore in droves during moonlit nights in May and June to lay its eggs on the beach. On a quarter-mile of beach last year 99 turtle nests were counted, with a guestimate of about 125 eggs to the nest. That should have produced quite a crop of young ones, but Mr. Raccoon thinks nothing of ganging up with his fellows to stand behind an egg-laying turtle and seize the eggs almost as she drops them.

To keep the human predator at bay the Fish and Wildlife Service has erected four tall, steel towers at strategic points in the refuge. Visitors think these have something to do with bird watching, but not so. From them refuge guardians can watch the human birds who tend to sneak into the refuge occasionally for a shot at a marsh hen, or a duck, or a snatch at a nest of turtle eggs. During the war these towers were manned by the Coast Guard in their watch for submarine activity, and it is the proud legend of the refuge that they proved useful in the pinpointing and subsequent destruction of some of these enemy weapons.

The island has one drawback for it is rich in wood ticks. During the cool weather the ticks remain in abeyance, but with the coming of spring they occur in such quantity that it is impossible to step off any pathway without picking up some of these burrowing pests. Some of them are even impervious to high-powered insecticides, and use of some of these poisons would so greatly endanger other insects upon which the birds must feed that no satisfactory fight can be made against the ticks.

For if the insects were destroyed Bull's Island might lose its painted buntings, which are so eagerly sought after by bird watchers and photographers. So this is another management problem with which the four men at Cape Romain must cope in their ceaseless battle to maintain this remarkable refuge.

Arrangements and reservations for transportation by government boat and accommodation at the Dominic House lodge may be made by mail through the Refuge Manager, Cape Romain National Wildlife Refuge, McClellansville, South Carolina. Boat departure times are governed by the tide and it may be necessary to wait over night in McClellansville. The refuge manager will arrange comfortable accommoda-

tions in town when necessary, if he is asked to do so. This reserving is entirely a courtesy on the part of a very busy public servant, a thought to keep in mind when writing.

Reservations for the twice-weekly Audubon Society's trips may be made through the society's national office, 1000 Fifth Avenue, New York City, 28. These group trips, under the guidance of the distinguished bird man, Alexander Sprunt Jr., leave from Charleston. The fee is \$15 per person plus charges for accommodation on Bull's Island.

Room and meals on the island are \$6 per day. Passage to the island by government boat is free. Boats may be chartered locally for off-schedule runs to and from the island. They are expensive.

PLANT HUNTING ON AN ISLAND

(Continued from page 360)

"The dune was almost a mile from my cabin then," he said, "and I thought I could protect the flower if I brought it home, but now the dune is here, too." He patted the smooth trunk affectionately. "It is such a pretty flower!"

We saw his eyes drop to the ground, where already the sand was starting to encircle the base of the tree. We knew that he was seeing the dune creeping up, hour by hour and day by day, gradually smothering the leaves and the flowers until it would choke the last breath of life from the gallant plant.

Russian John did not know it, but his "pretty flower" was one of a race that has puzzled botanists for all of the many years since the Channel Islands were first searched over for plants. Eighteen species of *Lavatera* are found native to the Mediterranean, one in Australia, and, except for four varieties on the Channel Islands of California, not a single species is indigenous to the American continent.

Writing in the *Botanical Gazette* in 1886, William S. Lyon laid particular emphasis on the mystery of San Clemente's *lavateras*.

"It is commonly known," he wrote, "that very many plants with skillful manipulation improve under cultivation. . . This is anything but the case with *Lavatera assurgentiflora*, which I collected on San Clemente from larger plants, in finer foliage and greater size and brilliancy of flower than anything observed in gardens. Its introduction into cultivation must forever be a bar to its complete extirpation; yet the natural tendency of the species I think we can show to be on the decline or toward extinction. Sealers report that, once abundant on Anacapa and San Nicholas, it is now scarce; on Clemente it was only observed in two localities, and only one or two plants in each; yet, only a dozen years ago (1874) it constituted un-

broken forest, extending for miles upon the high plateaus."

After the scientists have had their say, and the learned minds of two hemispheres have accorded the matter their most searching study, the fact remains that Russian John's protegee was the last specimen of *Lavatera* left on San Clemente.

Recently I talked with a fisherman who knew San Clemente well. He said that the advancing dune had at last forced Russian John to abandon the simple little home he had loved so well.

"For the last year or so," said my fisherman friend, "John spent most of his time trying to keep the dune swept out of his yard. But you can't fight a sand dune. I don't see why he stayed as long as he did."

One reason he had stayed, I knew, was because of a "pretty flower" he had once rescued from that same advancing dune. His abandonment of the cabin could mean only one thing—San Clemente's *Lavatera* chapter was closed.

ALICE EASTWOOD

(Continued from page 362)

1916, Miss Eastwood eagerly returned to her job. One of her first innovations was a living flower exhibit, a flower show that, still continued, is probably one of the oldest on record. And her fire-salvaged specimens formed an invaluable nucleus for future collecting.

To expressions of gratitude from Academy and city officials for her work in the fire, she replied simply: "It was a joy to me while I did it, and I can still have the same joy in starting it [the collection] again. . . The kindness of my friends has been great. I didn't know I had so many or that their affection for me was so warm and sincere. How fortunate I am!"

This from a woman who had lost all personal possessions in the fire—home, everything!

At their "Alice Eastwood Semi-Centennial," Academy officials printed this program tribute: "In this great and devastating holocaust [the fire of 1906], Alice Eastwood gave ample evidence of her spirit and courage. It was through her initiative and bravery that most of those Academy possessions. . . were saved. These included hundreds of botanical types, specimens that would be irreplaceable if destroyed. . ." The account went on to comment on Miss Eastwood's prudence in having had valuable specimens segregated from the main collection "so that they might be secured immediately in just such an emergency," a custom now thoroughly established in most herbariums throughout the country.

State agriculture officials have consulted Miss Eastwood on perplexing problems of Nature. Universities have asked her advice. Scientific societies throughout the world have sought her membership.

the world have sought her membership. From the very first edition, the editors of *American Men of Science* starred her name for outstanding accomplishments in her sphere, an honor probably not shared by any other living American woman in science. And she never let up writing scientific treatises.

Miss Eastwood's systematic and thorough study of western plant life, over the years, contributed greatly to man's knowledge of Nature, encouraged students of botany, and inspired the public's appreciation for the out-of-doors. Today her files contain more than 400,000 carefully pressed specimens.

One of the many plants she discovered, a bushy shrub bearing her Latinized name, is usually found growing only on potential oil lands, principally in Kern and Fresno counties of California. Which leads the knowing ones to say that wherever you find *Eastwoodia*—or Miss Eastwood in person—you are bound to strike it rich.

WHAT THE DOG BROUGHT

(Continued from page 384)

hound's-tongue, *Cynoglossum officinale*. The nutlets of hound's-tongue are flattened and covered with short, barbed prickles. These nutlets are rough, like a hound's tongue. Again, each flower produces four nutlets. Each plant produces manyflowers.

At least two members of the Rose family cause discomfort when fall rolls around. Agrimony, *Agrimonia gryposepala*, produces small, top-shaped fruits with a margin of hooked bristles at the upper end. Yellow avens, *Geum*, produces heads of slender fruits; each of which is armed with a hook that is longer than the fruit itself. Both are found in meadows and hedgerows.

Many other fruits and seeds are distributed in this way. Some sections of the country have more of one kind, fewer of another; but none are free from the spiny fruits that are carried from place to place by animals and man. Each year a new crop is planted as the fruits are removed from fur and clothing and dropped to the earth.

Gadgets for Fishermen

Two new products of piscatorial significance have come to hand. One of these is the All-See Pocket Case, a set of transparent plastic boxes in which a fisherman can carry his lures and such, and quickly see which is better. These boxes are also useful to collectors of a wide variety of natural history specimens. Further information can be had from R. P. Cargille, 118 Liberty Street, New York 6, N.Y. The other gadget is of exclusive interest to fly-tyers. This is known as the D. K. Tack-L-Bobbin. It holds a full spool of thread and greatly speeds up the tying of the fly. It is made by the D. K. Machine Products Company, 1172 South La Brea Ave., Los Angeles 35, California. They will be glad to supply further details.

Massey Heads Committee

Announcement is made of the acceptance by the Right Honorable Vincent Massey of the chairmanship of The Canadian Quetico-Superior Committee. This committee will parallel the work of the President's Committee in the United States, seeking the aid of governmental agencies, and conservation, civic, scientific and educational organizations, to the end that the Quetico-Superior country may be preserved and wisely used in the public interest. It is felt that Mr. Massey's acceptance, and the formation of a distinguished Canadian committee to serve with him, is an important step toward the final establishment of this fine wilderness area.

Pittman-Robertson Decade

Ten Years of Pittman-Robertson Wildlife Restoration. By Robert M. Rutherford. Washington 5, D.C. 1949. Wildlife Management Institute. 128 pages. Illustrated.

A decade ago the Pittman-Robertson Act became law, diverting to wildlife restoration purposes the tax on arms and ammunition. These funds have been expended, in cooperation with the States, on approved projects designed to increase wildlife, improve its habitat, and further programs looking to its maintenance. This bulletin is an estimate of the accomplishment of ten years by the chief of the branch of the U.S. Fish and Wildlife Service concerned with Federal aid.

Life Elsewhere

Life on Other Worlds. By H. Spencer Jones. New York, 1949. The New American Library. 162 pages. Illustrated. \$3.35.

This is the "drugstore," Mentor Book edition of this interesting and provocative discussion by Britain's Astronomer Royal of the question of whether ours is the only inhabited planet. This is always a fascinating subject for lay conjecture, and Dr. Jones here informs us as to what astronomers know of the possibility of life on other worlds.

Outboards

The Outboard Motor and Boat Book. By Robert J. Whittier. Concord, Mass. 1949. Voyager Press. 148 pages. Illustrated. \$2.00.

This book is designed as a complete guide to the users of outboard motors and the various types of boats to which this means of marine locomotion are adapted. Nothing appears to have been overlooked.

A Lake's Story

"The Story of a Lake" is the title of a graphic bulletin, Circular 644 of the University of Illinois, College of Agriculture. In picture and brief text it tells the story of a small lake in central Illinois, what it means to the farmer, and what happens when the lake is abused and neglected. This is a dramatic soil conservation document.

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CATCHING FISHES WITH THE HANDS

(Continued from page 386)

is put into the man's mouth and is bitten through. The fish is then either thrown ashore or placed in a string bag, which is often carried for fish and game. The smaller fish, such as *Callichthys* [a catfish], are usually killed in this way."

Lake Junin, whose native name is Chin-chaycocha, is near Cerro de Pasco on the high plateau of central Peru. C. H. Eigenmann and W. R. Allen report that they had great difficulty in collecting fishes in this shallow, mud-bottomed lake, the margin of which was overgrown with a closely-matted jungle of aquatic plants. Beyond this fringe, numerous fishes could be seen, but could not be got at with hook and line, with nets, or dynamite. In this dilemma, "... a Peruvian came to our rescue. With a hardhood inherent in the dwellers of the bleak pampas, he stepped into the water to his thighs, supporting his weight on the rhizomes and roots of plants. Here he searched among the stems for the fishes, and found them" — as his ancestors probably had done in this very lake in the long-gone days of the Incas.

In a personal letter, Professor Allen makes the matter even clearer, saying, "The lake was almost enclosed on every side by shore and emergent plants. A false bottom or mattress of roots extended considerable distances into the lake off shore, forming a tangled mass sufficient to bear the weight of the Indian alluded to. ... The Orestias (poeciliid fishes) were occupying holes among the roots out of which the Indian picked them. The natives were so familiar with this method of collecting that there is no doubt of its being employed by them as the standard fishing procedure for that locality." Here then is established a second locality for fishing with the hand in South America.

So, we discover, hand-fishing has been and still is practised in the two Americas. Perhaps others can contribute additional experiences.

GOPHER TORTOISE

(Continued from page 366)

species of mice, which make excellent food for snakes. The burrow harbors, also, several species of insects, including one beetle, known as "the tumblebug," which lives on the dung of its host.

The eggs of the tortoise are spherical, very white and have a shell similar to that of a bird. They are laid about one foot in front of the burrow at a depth of six inches. The eggs are sometimes eaten by humans, and there are many reports of the flesh of the turtle itself being eaten, but I much prefer to leave the tortoise undisturbed.

This tortoise, unique inhabitant of some of our eastern reservations, is well worthy of strict preservation in our Ever-

glades National Park. Its present plight must be recognized soon however, for instances of its wanton destruction by gun-bearing vandals have already been noted.

An Animal Day

October Fourth will be observed as World Day for Animals, and E. Clifford Pratt of 82 Willow Avenue, Toronto 8, Ontario, Canada, asks us to mention this event. The day will be dedicated to St. Francis of Assisi. Churches are urged to turn attention to animal welfare on either Sunday October 2 or 10. Space does not permit more extensive details of this observance, but we gather that Mr. Pratt would be happy to inform anyone interested.

Flower Week

National Flower Week will be celebrated from October 30 to November 6 to increase public knowledge of flowers. This is the fifth annual observance under the auspices of the Society of American Florists and Ornamental Horticulturists, 326 West Madison Street, Chicago 6, Illinois. Further information about this week may be obtained from that organization.

Botany Courses

Winter travelers, home owners, gardeners, teachers, Nature study leaders, and amateur botanists will all find courses to meet their needs in the educational program being offered in the fall of 1949 by the New York Botanical Garden in Bronx Park. Sessions all begin in September. A complete schedule of classes for the coming season and for the following year will be sent free upon request. Some of the classes are taught by members of the staff of the New York Botanical Garden, others by outside authorities. As a new feature this year, married couples who wish to enroll together for a class will be given a reduction in the total fee.

Gadgets

From the Edwards Chemical Company, 508 Third St., Des Moines, Iowa, comes a lipstick-size gadget that is designed to relieve the sting and itch and danger of infection from insect bites. It is called QUIT-ITCH and costs fifty cents. ... Hungerford Plastics Corporation, Murray Hill, New Jersey, sends us an attractive plastic dog collar (which we passed on to Fred Packard of the National Parks Association for his terrier, Juliet) known as the Flex-collar. It has an identification tag pocket molded into the collar, and is made in six colors. There is also a plastic leash, but they did not send us that. ... B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio, sends us information about Goodrite z.i.p., a deer repellent calculated to discourage deer from eating one's truck garden crops. ... Dr. Irving P. Krick, 126 E. Colorado, Pasadena, California, has developed a

weather guide based upon wind and cloud formations as indicators for coming weather. It is designed to take the uncertainty out of outdoor plans, and sells for \$12.50 in sporting goods stores, or from the originator at the address given.

Foresters to Meet

Seattle will be the site of the annual meeting of the Society of American Foresters, professional organization of foresters, who will gather there from October 11 to 13. Specially arranged field trips will be held both before and after the three days of technical sessions. One feature of the meeting will be the dedication of the Gifford Pinchot National Forest, formerly Columbia National Forest. Mr. Pinchot was the first president of the Society, which was organized in 1900.

Horticultural Council

The International Horticultural Congress of the American Horticultural Council will be held in New York October 30 to November 1. The subject of the general meeting on October 31 will be "Recent Achievements and Outstanding Needs in American Horticultural Education." Further details about the meeting may be obtained from the Council at West Grove, Pa.

Marine Studies

Through collaboration between the University of Florida, Florida State University and The James Foundation, greater emphasis will be placed upon marine biology study in Florida. The Foundation has established a marine biology station on Estero Island near Fort Myers, an extension of its previous activities. Undergraduate and graduate studies in cooperation with the two universities will be carried on, and research furthered at what will be known as the Shell Mound Experiment Station. Further information is available from Robert Spencer Carr, The James Foundation, Fort Myers Beach, Florida.

Waltonians Resolve

Many resolutions on phases of conservation were submitted to the recent 27th annual convention of the Izaak Walton League of America in Denver. Among those passed by the delegates were: Urging the acquisition of private lands within the boundaries of National Parks, particularly asking that steps be taken to prevent cutting of timber on State owned lands in Glacier National Park; permitting alteration of the boundary of any national park only in the interest of the reservation itself; commending the decision of several agencies to abandon the Glacier View Dam project; urging creation of a board of review to consider all aspects of developments by the Bureau of Reclamation, Corps of Engineers, valley authorities and administrations and the flooding of huge government-supported bond issues in the name of conservation.

WOODPECKERS

(Continued from page 365)

that the ants come pouring out, laps them up in quantities. Or, the bird might insert its long, sticky tongue deep into the nest to get the young and the eggs. Flickers also eat an abundance of fruit, mostly of wild varieties.

Although the birds noted represent only a few of the sixty or more different kinds of woodpeckers in North America, they reveal characteristics that are common to all. Whenever he is seen, the woodpecker is busy. The wholesale destruction of insects is his chief occupation, and the significance of this is proclaimed by all men who know our forests. Their testimonies complete the story.

Insects are great forest enemies. They were instrumental in destroying five hundred million cubic feet of Canadian timber in 1948, nearly two hundred million more than are claimed by fire. The trees killed by insects become fire hazards. Man, as yet, has no effective control over such pests, and authorities are agreed that without the check placed on them by birds in general, we would have no trees. As one of these self-imposed insect exterminators the woodpecker is unique. Only woodpeckers can dig out those insects that actually infest the wood of living trees. In so doing they remove the dead, rot-producing wood, and promote the growth of healthy trees. It is no wonder that the woodpecker is officially recognized as a benefactor of mankind, and is protected by law. It is only unfortunate that the reason is not clear to all.

It would, of course, be foolish to imagine that woodpeckers are models of virtue. We can see that they are not. The worst is the sapsucker. An important part of his diet is the sap of trees, and he seriously impairs their health and their commercial value with his tap holes, at the same time refusing to make insects an important part of his diet as compensation. But he is the exception. Other woodpeckers are guilty of isolated and minor offenses. They do damage wooden property, but far less than the ants they devour. They do steal fruit, like other birds, and they are noisy, sometimes. During the mating season a flicker once delighted in drumming his love call on an eaves trough over my window.

The woodpecker shares the plight of the man who makes ten New Year's resolutions and successfully keeps nine. Others never know of the nine, they judge him by the one he breaks. By failing to recognize that the good qualities of these birds far outweigh their bad ones we do both them and ourselves a grave injustice.

The gun, aimed indignantly at all woodpeckers, is also aimed at our trees and, ultimately, at us. As an agent for our own good the woodpecker should enjoy our fullest protection and encouragement. A true acquaintance with these birds will assure them of that appreciation.

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South Africa

Word comes from J. A. Lee, Secretary of the Wild Life Protection Society of South Africa, P.O. Box 1742, Johannesburg, that the Society has voted to accept subscribers to its quarterly, *African Wild Life*, at ten shillings and sixpence per year. Thus this attractive, illustrated magazine is available for \$2.50 a year. Membership in the Society, including the quarterly, is five dollars. South Africa is faced with declining animal populations, and this organization is fighting to preserve and increase the numbers of all species. The magazine is one means of carrying on its work, and each issue contains much interesting and valuable material.

Hamster Market

Warning comes from the U.S. Department of Agriculture that the market for golden hamsters is distinctly limited. Only occasionally can a beginner at the production of these little rodents make satisfactory contact with profitable outlets, and the margin of profit is small. Raising the animals for pets, without hope of profit, can, of course, be interesting, but it is warned that it is dangerous to turn the hamsters loose since they are potentially a pest.

Wisconsin Deer

Pertinent to any understanding of the problems created when deer populations become too numerous for the region they inhabit is an interesting report by Ernest Swift, Conservation Director of Wisconsin. This is presented in a pamphlet entitled "Wisconsin's Deer Damage to Forest Reproduction", and is Publication No. 347 of the Wisconsin Conservation Department, State Office Building, Madison 2, Wisconsin.

Quoth Coleridge

We usually do not pay any attention to anonymous correspondence, but a letter postmarked only Chicago, and signed only "Subscriber," asks us to print a few lines from Coleridge. They can well be quoted, so here they are:

He prayeth well who loveth well
Both man and bird and beast:
He prayeth best who loveth best
All things both great and small:
For the dear God who loveth us
He made and loveth all.

We Go to Sunday School

We will confess that we had not thought of such a use of *Nature Magazine* but Mrs. Camilla W. Wilson of Sedalia, Missouri, writes that the magazine contains a great deal that a Sunday School teacher can use in her classes. Mrs. Wilson makes a particular hobby of Bible plants, and works other text material into her teaching, which must make her Sunday School classes extremely interesting.

Lethal Ceilometer

Nashville, Tennessee's airport, in common, we presume, with others, has a ceilometer. This is a powerful narrow light beam that measures the height of the cloud ceiling. During the night of September, 9-10, 1948, this beam reached to a ceiling of 2400 feet, lifting to 4000 during the night. Many migrating birds passed over the airport, some of them entering the path of this beam. Apparently becoming temporarily blinded, many birds fell fluttering to the ground. Most of them were killed, although a few were still alive and recovered, being released after banding. Nearly three hundred birds were counted as victims. These were not only small birds but the fatalities included one bittersnipe and six grebes. This occurrence is described in detail in an article by Walter R. Spofford in the March, 1949, *Migrant*, quarterly of the Tennessee Ornithological Society.

Adirondack Museum

In order to promote and encourage historical study and research, and to gather and disseminate material about the Adirondack region, The Adirondacks Historical Association has been incorporated and chartered under the University of the State of New York and the State Education Department. A museum will be erected at Blue Mountain Lake, and work has already started. Further information may be obtained from the Adirondacks Historical Association, Blue Mountain Lake, New York.

Recent Bulletins

Among the important and valuable recent bulletins received are "Trees of Mount Rainier National Park," by C. Frank Brockman, a 49-page publication, with illustrations and descriptions of these trees. It is published by the University of Washington Press, Seattle 5, at seventy-five cents. . . "The Birds of Aroostook County," by Glen D. Chamberlain, 22 Academy St., Presque Isle, Maine. This is a list of spring migration dates for the birds of lower Aroostook Valley, republished from the Bulletin of the Maine Audubon Society, and available from the author for twenty-five cents. . . "Insect Pests of Nursery and Ornamental Trees and Shrubs in Oregon," by Joe Schuh and Don C. Mote. This 164-page, illustrated bulletin, the title of which indicates its contents, is one of the many excellent publications of the agricultural experiment station, Oregon State College, Corvallis, Oregon. . . "Wheeler, A National Wildlife Refuge" is the title of the seventh in the series "Conservation in Action" published by the U. S. Fish and Wildlife Service. It is the work of Thomas Z. Atkeson and is available from the Superintendent of Documents, Washington 25, D.C., for fifteen cents. . . "Some ABC's of Conservation" is a 28-page, pictorial presentation of basic conservation facts published by the Wisconsin Conservation Department

at Madison. . . Of particular interest to educators are "Teaching Conditions and the Work Week of High School Science Teachers," published by the National Science Teachers Association, and "American Education and International Tensions," published by the Educational Policies Commission. Each one is available for twenty-five cents from the respective organizations at 1201 16th Street, N.W., Washington 6, D.C.

Albino Robins

In the March, 1947, issue of *Nature Magazine* we carried a story of three albino robins—Papeek, Weewee and Cherilee—found near Toronto and transferred to the aviary of H. Roy Ivor at Erindale, Ontario. There it was hoped that they would breed, and, perhaps shed some light on the maintenance of the albino strain. Recently a reader asked for a report on the present status of the birds, so we wrote Mr. Ivor. He replies that the birds are as lively and as beautiful as ever, and still pugnacious. Weewee, the female, accepted Papeek as a mate and attempted to build nests in a lot of compartments in the aviary in 1948. The result was confusion and no nest or eggs. This year they were being placed where this would not occur. Cherilee, the other male, mated with a five-year-old female, who laid eight eggs in two nests and ate all the eggs. So the only report is that the birds are alive and healthy, and no light has been shed on albino succession.

Price Memorial

On July third, at Fallen Leaf Lake, California, a bronze plaque was dedicated in honor of W.W. Price, who inaugurated there in 1919 what was to become the Ranger-Naturalist interpretive program of the National Parks. Mr. Price, a biology graduate of Stanford University, learned of the Nature guiding movement brought over from Europe by Mr. and Mrs. C. M. Goethe of Sacramento. He induced the proprietors of Lake Tahoe resorts to participate in such a program. Stephen T. Mather, then Director of the National Park Service, saw the value and popularity of this work and requested its introduction into Yosemite in 1920. From this has grown the fine interpretive service in all our national parks, and it has also been extended to many State parks, including the extensive Redwood Parks of California.

Protect the Eagle

Three bills, S 1901 in the Senate, introduced by Senator Johnson of Colorado, and HR 5507 and 5629, introduced respectively by Congressman Angell of Oregon and Congressman Grant of Alabama, would extend to the bald eagle in Alaska the same protection afforded our national emblem in the United States. Testimony of specialists indicates that the charges of predation by the eagle are in large measure false and certainly exaggerated. These bills should pass.

THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

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Yosemite's Sequoias

"A Guide to Yosemite Sequoia's" is the title of a special number of Yosemite Nature Notes published by the Yosemite Natural History Association, Yosemite Park, California. It is the work of James W. McFarland and is just what the title indicates—a guide to the sequoias, collectively and individually. Copies are available at fifty cents.

Under the Microscope

By JULIAN D. CORRINGTON

NEW PHOTOMICROGRAPHIC LAMP

ONE of the chief problems attendant on taking photographs through the microscope, whether as a hobby or a profession, has always been the light source. For high-power and color work, especially, a powerful point source is essential, and the best illuminant has been a ribbon-filament tungsten, or else a carbon arc actuated by a clockwork-fired mechanism that has always left much to be desired. Now comes the amazing war-accelerated development of an entirely new kind of lamp. Just as people used to refer to Edison's first carbon-filament lamp as the "light in a bottle," so this new illuminant is an "arc-light in a bottle," long considered an impossible accomplishment.

Invented just prior to World War II and developed under a NDRC contract by the Electronics Division of the Western Union Telegraph Company, Water Mill, Long Island, New York, the concentrated-arc lamp has now been released for general sale, and is available in a wide variety of types for various purposes. Most of them resemble radio tubes.

The light source is a small incandescent spot, which forms on a specially prepared refractory zirconium oxide cathode. Establishing an arc between this and an anode made of a metal, such as tantalum, which has a high melting point, raises the oxide surface to its melting point, with the emission of a brilliant white light. A cloud of vaporized material extends outward a few thousandths of an inch, but returns to the cathode, thus renewing the surface and giving the lamp a life measured in hundreds of hours. All this takes place in a tube that is first evacuated and then filled with an inert gas, usually argon, and is a far cry from the large carbons that wear away so rapidly in the regulation carbon arc lamp.

The size of the luminous spot in the concentrated-arc lamp is only 0.037 inch (less than 1 mm.) in diameter, and its position is fixed and sharply defined. The brilliance is uniform; the color temperature of the 40-watt lamp is 3200° K. and its average life 850 hours.

The lamp itself, although basic, is only the beginning of the whole assembly shown in the accompanying illustration, set up for use with a microscope. The Fish-Schurman Corporation, scientific instrument and optical manufacturers, have used this new illuminant in their "Zircarc" photomicrographic lamp, designed for any sort of service where a superior light source is desired. The cast-aluminum housing, mounted on a heavy cast-iron base for stability, includes the concentrated-arc lamp and a radically new condenser system of seven coated optical elements, corrected for color, spherical aberration, and coma, with E.F. 16.5 mm., N.A. 0.77. A full 100% cone is collected from the hemispherical light source and delivered free from defects by focusing on the substage mirror so as completely to cover condensers of even the highest aperture.

The lamp must be started by a momentary surge of high voltage. This is done by a starting box, which also rectifies the subsequent current so that the outfit may be plugged into the household circuit. A 30-volt, 2-ampere D.C. current results, and an amperite regulator minimizes current fluctuations. The box is an independent unit that may be used as a battery-charger or for other purposes.

The lamp may be placed in any position, including the vertical. It is sufficiently rugged in construction as to withstand any abuse short of breaking the glass. Transparencies, direct prints,

and separation negatives may be made in color, and black-and-white micrographs of superior quality at all magnifications, high-dry darkfield, oil immersion, and either for visual or projection work. The spectral range of the lamp extends into both the infrared and ultraviolet.

Because of the great brilliance — about ten times that of a tungsten filament — the exposure time using the concentrated-arc is greatly reduced, which means less harm to living specimens and greatly lessened chance of damage from vibration. Because the time may often be so short, a shutter, with cable release is supplied as an extra, to be inserted on the lamp, instead of on the camera or microscope. Filters are not as necessary as with other illuminants, but are made available as extras.

Prices: ZL-321, as shown in illustration, complete with power supply for 110-120 V, 50-60 cycle AC, \$325.00. Extra bulbs, type 321-7, 40-watt, \$30.00. Filter adapter, \$2.00. Filters, 36.5 mm. diameter, \$3.50. Shutter, with cable release, \$30.00. Technical details may be found in *Characteristics and Applications of Concentrated-Arc Lamps*, by Buckingham, W. D. and C. R. Deibert, Jour. Soc. Motion Picture Engineers, 47, No. 5, Nov. 1946, pp. 376-399; also in Jour. Photo. Soc. Am., 12, 1946, 610. The outfit may be obtained from distributors and dealers; if unable to contact one in your vicinity, write to the Fish-Schurman Corporation, 230 E. 45th St., New York 17, N. Y.

HISTORICAL OUTLINE

Correction, Please!

Dr. Robert M. Stabler, parasitologist, who teaches at Colorado College, Colorado Springs, has written to call attention to our misuse of certain terms in the February, 1949, issue. It was a case of our knowing better, but falling carelessly into a usage that is not correct concerning the terms *monogenetic* and *digenicetic* as applied to flukes.

These words mean, respectively, one-generation and two-generations, and have reference to the life cycles. A monogenetic fluke reproduces only sexually. Reproduction is said to be direct, without metamorphosis, or with but a simple one. Digenetic flukes have "alteration of generations" — as classically interpreted — with one generation, the sporocyst, reproducing asexually and alternating with the adult fluke that reproduces sexually. A monogenetic fluke needs and usually has only one host, while the digenetic type requires two hosts, one for each generation, since there are intervening free-living stages.

It is easy to slip into the habit of using monogenetic as if it meant "one-host," and digenetic to mean "two-hosts." We have made this error also in our *Vocabulary*, appearing earlier. Upon looking up numerous references, we were surprised to find that practically all writers, both of general zoology texts and of strictly parasitological works, have likewise more or less fallen into this semantic trap, either directly or by implication. There are no terms for these meanings, and hence everyone uses those available, knowing full well what they mean, but becoming careless in their phrasing and its consequent inferences.

Strictly speaking, digenetic is not correct as it was originally intended. Most parasitologists today interpret formation of rediae and cercariae as occurring by parthenogenesis, a modified sexual process, and if this is so there is no true alternation of sexual-asexual methods. And not even these two sexual types "alternate," as several generations of the "asexual" forms may follow one another.

Our correspondent objected even more strenuously to "trigenetic," which is, of course, etymologically absurd as applied to life cycles. A certain amount of revision in nomenclature seems needed, and especially a set of new terms designating number of hosts. We suggest monohospic for cases where the number is one, and more generally polyhospic for cases where the number is greater than two but unknown or uncertain or variable. These words are based on the Latin *hospes*, host.



Fish-Schurman Zirconarc Lamp.

THE MICROSCOPE MAKERS VI. Ivan L. Nixon

On June 25, 1949, death took one of the most eminent of the microscope makers of our day, Ivan L. Nixon, of



Ivan L. Nixon, 1883-1949.

the Bausch & Lomb Optical Company, vice-president in charge of their Scientific Instrument Division, member of the board of directors, industrial preparedness representative, and director of their Canadian company.

Mr. Nixon was born at Manhattan, Kansas, July 9, 1883, and took his B.S. from Kansas State College in 1903. Following graduation he was appointed assistant New York State entomologist. Four years later he joined the Instrument Sales Division of Bausch & Lomb and soon climbed to the management of the Industrial Sales Division. In 1933 he became Sales Manager of the Scientific Instrument Division.

During World War II, Nixon was responsible for the handling of most of his company's military contracts for optical gunfire control equipment. After this period he became manager of the Scientific Instrument Division, and was elected vice-president in 1947, a fitting tribute to forty years of service to his field and his

company. During this time he contributed materially to the development of many types of instruments, including balopticons, photomicrographic and metallographic equipment, contour-measuring projectors, and motion-picture lenses.

His colleagues describe his great personal charm and traits of character that brought him rapidly up the ladder of success — perseverance and consistency, high principles and common sense all marked his management. Once convinced that the company should design and build a particular sort of instrument, he displayed tremendous energy in analyzing its market possibilities and in integrating and following through on all phases of its final production. He created enthusiasm when it was needed and toned down misdirected energies on other occasions.

Mr. Nixon was a member of a great many national and local scientific, government, industrial and civic societies. He was a director of the Scientific Apparatus Makers of America, and chairman of their optical section.

REVIEWS General Biology

Not long ago we reviewed the 3d edition of Dr. de Laubenfel's *Life Science*. Hard on its heels comes a new 4th edition, attesting to the popularity of this work. The page size, 8 x 11, remains the same, but the new book is a far superior, fully printed issue, the chief consequence being an immense improvement in illustrations. These constitute a conspicuous feature; excellent photographs from many sources, some original, and a large number of drawings by the author, mostly adequate. They assist interpretation of the text more fully and perfectly than in any other book we have seen. They make a beautiful volume and one that compels reading. A picture captures your attention, you read the subscript matter, and then want to read further in the adjoining text. *Stimulating* is the key word most reviewers have stressed.

The writing has an original style all its own, and one we enjoy and find most effective; sometimes terse or clipped, al-

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ways trenchant, and evermore carrying on the good fight against superstition and ignorance, be it against fads in diets or charlatans in professions. The book is crammed with thousands of interesting facts, observations, and experiences, all integrated so as to tell a story. Two new chapters appear, plant physiology and agriculture, to round out all phases of life science. The heading of each of the 28 chapters is the title of a subsience, as biochemistry, histology, dietetics, oceanography, or anthropology. Each concludes with a few brief biographical sketches and literature references. While intended for class use in either a one- or two-semester course, this book, more than most others, is admirably suited for self-instruction by the layman who wishes an interesting and authoritative book on modern biology. Pp. vi, 407; figs. 1024. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, 1949. \$5.75.

Anatomy

Two new *Graphic Aids* have been added to enlarged second editions of the original five. Each item consists of a folder containing loose sheets with labeled drawings. Their titles, number of plates, and prices are: *Graphic Aids to Osteology*, 23 plates, \$1.50; to *Myology*, 25, \$1.50; to *Neurology*, Series 1 - Central Nervous System and Cranial Nerves, 25, \$1.50; same, Series 2 - The Autonomic Nervous System, 24, \$1.50; to *Histology*, 22, \$1.50; to *Angiology*, Series 1 - The Arterial System, 24, \$2.00; to *Dental Anatomy*, 35, \$2.00. Three of these *Aids* are by Chester O. Botts and Associates, four by Raymond H. Houser.

Taking the first as an example, the 23 plates on osteology contain a total of 125 drawings, to which are appended three pages of text, with classification, glossary, and index. In the case of the skull alone, there are 7 plates comprising 38 drawings, all fully labeled, showing each aspect, both external and internal of the entire or sectioned skull, and of each bone individually or in associated groups. The drawings are made as simple and diagrammatic as possible in achieving an artistic likeness. They should prove of decided value to students and teachers of zoology, anatomy, art anatomy, medical students, and those engaged in physical education. Others in the series will appeal to related specialties. Order from Scientific Illustrators, Box 175, North Park Station, San Diego 4, Cal.

Astronomy

It has been fashionable for many years in the astronomical field to center attention on remote galaxies, disdain to notice such proximal objects as the planets. As for the moon — that nextdoor neighbor is just a step away by tomorrow's rocket ship! Our morning paper states that a rocket society has set 1960 as the date for the first flight to Selene's domain.

Perhaps this very possibility is a timely justification for Ralph Baldwin's *The Face of the Moon*, a thesis maintaining that we can see the effects of certain important early events in the history of our own planet, completely masked and concealed by subsequent happenings, by looking at the face of the moon. On that satellite, with neither water nor atmosphere, there has not occurred the sequence seen on earth of uplift followed by weathering, erosion, and deposition, with a resultant burial of the ancient record by sedimentary rocks. Topography on our planet is the outcome of many forces, on the moon mainly of one — the fearful bombardment by millions of meteorites. The author accounts not only for the so-called "craters" by this cause, but even for the maria ("seas" of lava). A crater is thrown up, not merely as an impact splash, but as the chief result of a terrific explosion, due to the sudden release of energy of a magnitude to dwarf an atom bomb. The great majority of these collisions happened far back in geologic history, both to the moon and to various planets, as the earth, but may still occur at any time.

The book is interesting; at times thrilling. On the whole it is well written and illustrated. We believe, however, that it needs editing in the sense that the author has not made up his mind as to the group of readers he is addressing. Many parts are too elementary for professional astronomers, whereas other sections

are too technical for laymen. The book would be greatly improved by the addition of a glossary of terms and by some really good lunar maps that could be followed by the non-professional. Pp. xiv, 239; pls. XVII, figs. 26. Univ. Chicago Press, 5750 Ellis Ave., Chicago 37, 1949. \$5.00.

Philosophy

ONE of the most romantic and interesting figures in the history of civilization is the great Elizabethan critic, Sir Francis Bacon. Forever restless, seeking political promotion and intellectual conquest, the author of *The Advancement of Learning* and of *The New Method* has been credited with everything from introducing the scientific method (which is true) to the authorship of Shakespeare's plays (which is false) and has been accused of everything from overreaching dilettantism (which is true) to displaying all the faults he so ruthlessly criticizes in others (which is false).

His biography is available in many forms, his complete works in a number of editions, and there are numerous essays or chapters on the role and influence of Bacon in one field or another. In *The Philosophy of Francis Bacon*, by Professor Fulton H. Anderson we have "for the first time a systematic and compact treatment of the entire body of Baconian philosophy." The author holds that most criticisms have been unfair or incomplete in that they have considered only the better known of the more than thirty philosophical works of Bacon. Like others before his time and since, Bacon planned to revolutionize all knowledge, and like these others he, too, failed to make more than a feeble beginning. Unlike most others, however, he kindled a spark that was carried on by his scientific successors until it blossomed into the full inductive philosophy of our times.

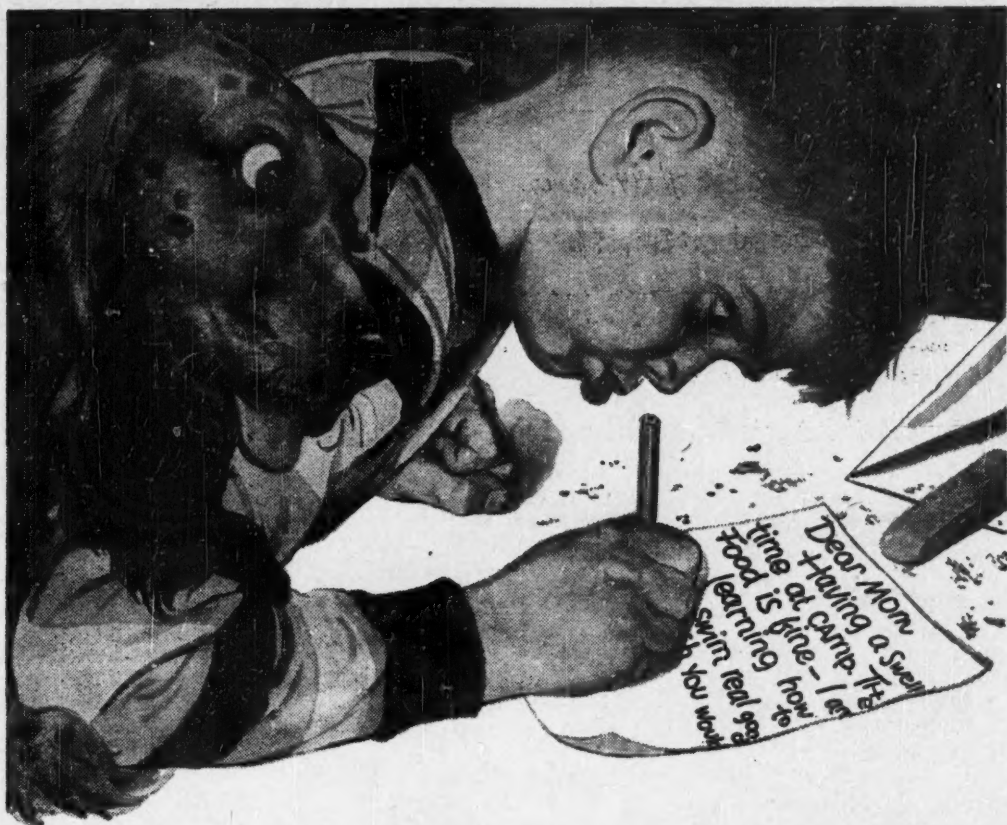
By means of quotation, paraphrase, and his own evaluations, the author explores Bacon's attack on the Universities, his revival of materialism, his partial agreement with Plato but complete contempt for everything Aristotelian, and especially his grand plans for the reformation of philosophy and learning. A scholarly and well written work, this, of importance to all who are interested in the history of science and philosophy. Pp. vii, 312. Univ. Chicago Press, 5750 Ellis Ave., Chicago 37, 1948. \$4.00.

Zoology

THE second edition of *Laboratory Explorations in General Zoology*, by Dr. Karl A. Stiles, Michigan State College, has been prepared with great care and attention to everything that goes to make up a successful manual — organization and authority of material, utility to teacher and student, flexibility, format, printing. The plan of the first edition has been retained while adding new sections; the demonstrations, questions, and drawings have likewise undergone revision and improvement. Still an important feature is the emphasis on defining and using the scientific method.

This is a large volume with spiral wire binding, designed for a year course, to accompany Hegner or other standard zoology text. It is so arranged that certain portions are omitted when used with a one-semester course. All of the time-honored animal forms are described, structure being correlated with function wherever feasible, and after each section there is a list of suggested drawings, ideas for demonstrations and a paragraph of questions and problems. Numerous outline drawings to be labeled or filled in and labeled are gathered together at the end of the book. Here also are several charts to complete.

Some manuals are very brief and do little more than tell a student how to dissect, then merely list the structures to be found. *Explorations*, however, belongs to the workbook school, with full information and exercises. It is therefore suitable not only for college class use, but also for the individual or science club desiring firsthand zoological experience. Teachers, we believe, will give this fine manual an enthusiastic reception. Pp. viii, 311; 39 pls. The Macmillan Co., 60 Fifth Ave., New York 11, 1949. \$3.25.



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